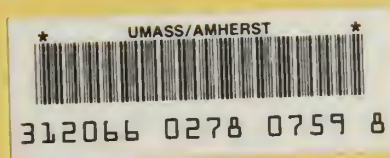


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CTPS TECHNICAL REPORT

49

USER'S GUIDE TO THE CTPS REGIONAL TRANSIT NETWORK

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CTPS TECHNICAL REPORT 49

TITLE USER'S GUIDE TO THE CTPS
REGIONAL TRANSIT NETWORK

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DATE APRIL 1985

ABSTRACT This report presents a computer-processible inventory of Eastern Massachusetts transit services. Included are commuter rail, rail rapid transit, and local and express bus service of the Massachusetts Bay Transportation Authority, and private-carrier bus service operated on a regularly scheduled basis. The inventory data set is compatible with the Urban Transportation Planning System (UTPS) program package. Use of the UTPS program with the data set, for network development and path determination, is described.

This document was prepared by **CENTRAL TRANSPORTATION PLANNING STAFF**, an interagency transportation planning staff created and directed by the Metropolitan Planning Organization, consisting of the member agencies.

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Massachusetts Bay Transportation Authority
Massachusetts Department of Public Works
MBTA Advisory Board
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ACKNOWLEDGMENTS

During the development of this transit inventory data set program, many persons were involved over a period of years. Since the beginning of the network development, CTPS staff members have contributed during either directly, working on the networks, or indirectly, through the operation of the highway networks or consulting on railroad and commuter rail questions or on other details required of data for a network inventory. Other persons involved included numerous Northeastern University Coop students who, during their period at CTPS, coded networks, punched data cards, and helped in numerous other details relating to network development. To acknowledge each individual without omitting anyone who played a part would be virtually impossible. Therefore, acknowledgment must be made simply--and gratefully--to all who had any part in the inventory development during these many years.

Thanks are also due to the Massachusetts Bay Transportation Authority, the Massachusetts Department of Public Utilities, and the private bus and rail companies that provided data. All of these organizations rendered invaluable assistance.



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SUMMARY

An inventory of the transit services operating on a scheduled basis within the Eastern Massachusetts region has been developed as a computer-processible transit network. This comprehensive inventory includes five transit modes: commuter rail, Massachusetts Bay Transportation Authority (MBTA) rail rapid transit, MBTA local bus and trackless trolley, private local bus, and express bus. The network also includes a walk link, an auto-penalty link, and an auto-access link. The inventory is compatible with the Urban Transportation Planning System (UTPS) program package of the U. S. Department of Transportation's Urban Mass Transportation Administration and Federal Highway Administration.

This manual presents detailed descriptions of the inventory of transit services, the basic traffic-zone structure for Eastern Massachusetts, the highway network structure, and other required data. The procedure for putting these base data into the machine-processible format is discussed in detail. Correspondence tables relating the computer-processible data to the transit services--e.g., node numbers to station names--are provided. Typical examples of network analysis are discussed. The coding forms used to develop the computer-processible data are shown in the appendix, along with other computer programs developed to aid in the processing of the raw data into the desired format. The nature of the transit inventory and the philosophy behind the network model are discussed as the details are presented. This transit network, as a computer-processible transit data set for the Eastern Massachusetts region, is a viable basic tool already being used in numerous studies. Certain improvements to this tool are called for and should be developed in the process of using it.

1.0 INTRODUCTION

The development of a transit network suitable for use in planning studies requires a translation of route equipment and other physical quantities into abstract representations such as nodes and links. In this transformation, a number of assumptions must be made which may be simplifications but nonetheless are required if a reasonable network is to be formulated.

The transit network can be looked at as an engineering system which requires an estimate of loads it will be required to carry. These loads are determined by social and economic forces and are generally difficult to estimate. However, the network model should be developed in such a way that responses of the transit system to such loads can be predicted. In other words, the network model should be able to function as a simulation model.

The socio-economic input might be termed the driving "function" for the network. These data usually relate how the population is distributed, the number of cars per household, percentage of land used, etc.--a vast number of variables are possible to describe the specific region under study. How does one reduce the multitude of "variables of description" to a number of quantities which can characterize the region or the traffic zone? This must be done so as to provide an appropriate algorithm to be used in specific studies.

The transit-network model serves as a basic tool for calculation of travel volumes, traffic patterns, and other transportation information. The ground-level simulation tool is the network, whether it is used as the full-blown, detailed network, or is reduced to a local representation, or is used in some other very specific way. It is important that the base simulation network process be factored into any study in order to understand how the various results are affected by how the input data are treated.

Few established guidelines are available to be followed in developing an abstract network model adapted to the computer. Many of the notes and suggestions provided in this manual may apply only to the particular techniques that were developed, sometimes intuitively, to meet the specific requirements of creating the Eastern Massachusetts Region Transit Network. A number of selected references are given in Appendix A. The literature on transit networks is quite varied but, although much work has been carried out, there remain many unanswered questions.

Dial, for example, in reference (8), states that very little effort has gone into research and development of network models for transportation planning. UMTA reference (4) is an introduction to travel forecasting for transportation planners and analysts using the UTPS program package. Although various aspects of modeling are considered in this text, there appears to be very little in the way of a rational procedure for developing the transit model for simulation purposes.

This paper attempts to break some new ground in presenting a procedure to be considered for the coding of the transit systems in a specified region or area. Much of the work is based upon an intuitional approach and upon observation. Much more work must still be carried out in order for a computer-processible transit network procedure to be perfected. Analysis will be required to determine how the new procedures can be effectively applied.

In Chapter 2, some background on our transit-network development is given. Chapter 3 presents the data requirements for operating the basic UTPS programs UNET and UPATH. The transit services in the inventory are discussed in Chapter 4, including the various data sources used, and mapping needs are considered. Chapter 5 is the user's guide to the transit network computer-processible transit inventory discussed in the previous four chapters. Methods that may be used to operate the basic UTPS programs of UNET and UPATH are explained.

Six appendices are provided. Appendix A lists basic references on transportation-related computer programs and selected general references on transportation, among others. Appendix B contains copies of the coding formats useful for developing the data sets needed for UNET. Appendix C summarizes the various data sets used in UNET and cross-references data sets, enabling one to locate links, nodes and line data whenever desired. In Appendix D, maps useful for the study of these networks, the base maps used for the networks and other useful maps are discussed. In Appendix E, sample deck setups that can be used to operate UNET/UPATH programs are presented. Appendix F deals with allied programs developed and used in conjunction with transit-network development.

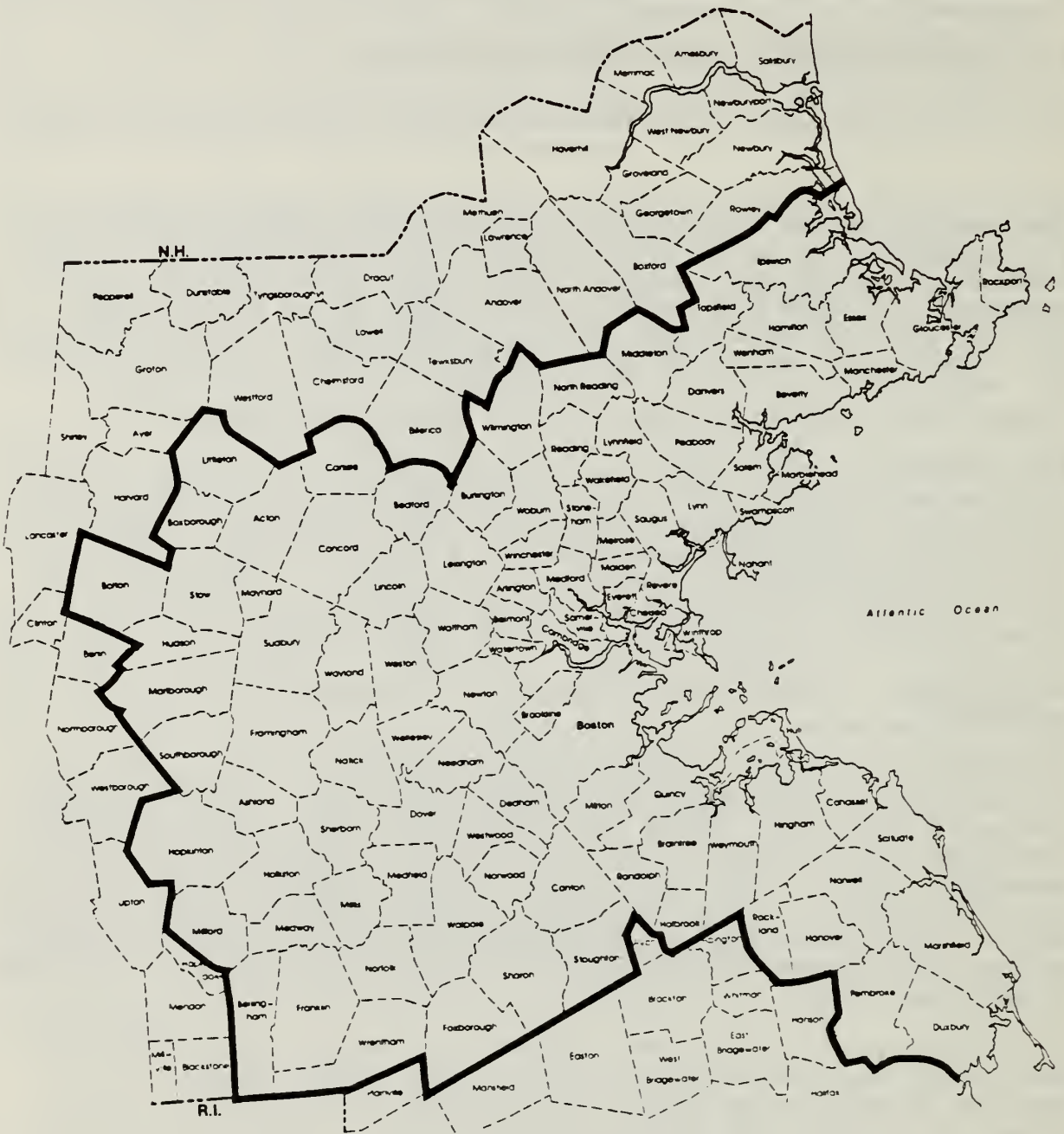
2.0 TRANSIT NETWORK DEVELOPMENT BACKGROUND

The transit network model was developed based upon a comprehensive inventory of the transit service within the Eastern Massachusetts region. Commuter rail, rail rapid transit, MBTA buses and non-MBTA bus service which operates on a scheduled basis in the 152 cities and towns in the region are included. The 152 communities in the Eastern Massachusetts region include 101 communities within the Metropolitan Area Planning Council (MAPC) area plus 51 outside the MAPC area. See Figure 2-1.

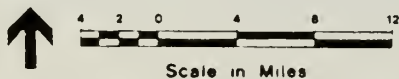
The transit network consists of a basic 1976-1977 transit network plus certain transit facilities committed for the base-year 1980 at the time of data collection. The route descriptions along with the assigned nodes are shown on a series of maps and tables of equivalent transit lines (on file at CTPS). Other pertinent data, such as the required distances, speed or time on a link for three possible time periods for each pair of nodes, and line information (including assigned line number, appropriate headway, and sequence of nodes which make up the line definition) are also presented.

The 1976-1977 transit network was developed as a joint coding effort with Alan M. Voorhees & Associates (AMV)--see reference (19)--and, modified with a 1975 update as well as certain 1980 committed transit facilities, was used as the simulation transit model for over a year. When more changes needed to be added to the base network, a critical review of the network model was made and it was decided that a completely new transit network should be developed based upon the experience gained from the use of the original network.

Considerable effort has been expended to develop a transit network which would accurately reflect the transit system of the Eastern Massachusetts region and operate computationally in an effective manner, and which could be used as the basic transit-simulation model for the region for some time to come with only minor modifications and updates as needed. All link speeds or times and headways for the various modes were carefully checked with current schedules at the time of data collection. Highway speeds were obtained from highway skim times to be used for the bus speeds on the particular segments of roadway on which they operate. Thus, much effort went into each phase of the coding. Details of each mode represented are discussed later on in this document.



— MAPC REGION BOUNDARY



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EASTERN MASSACHUSETTS REGION
WITH
METROPOLITAN AREA PLANNING COUNCIL
DISTRICT

CTPS

FIGURE
2-1

The transit characteristics for the computer network are developed in the Urban Transportation Planning System (UTPS) format. The data input is in the form of link, line, and coordinate data. The specific transit-network program, UNET, creates and modifies a computerized description of a transit network for use as input in other programs within the UTPS family of computer programs.

3.0 UTPS PROGRAM UNET: DATA REQUIREMENTS

This chapter contains the data requirements for operating the unit program UNET.

The 1980 transit-network model describes the transit network, including commuter rail, rail rapid transit, and bus routes. The procedure carried out to reduce the data describing the various routes, time tables and equipment used is set down here. The assumptions used to describe or develop the required data sets and the actual inventory data set developed are discussed.

Link data describe the physical networks relative to the fixed base maps being used, and line data describe the transit routes in terms of the sequence of nodes. Each link in the network has the following information:

- 1) two node numbers to identify the link (these describe the ends of a specific line segment)
- 2) a mode or modes classification, numbered 1 through 8 (up to 5 modes may be used on a particular link)
- 3) a time or speed of operation over link by period
- 4) a distance along the link
- 5) whether the link is one-way or two-way

The route description of each network line will have the following information:

- 1) a mode classification
- 2) an assigned line (route) number
- 3) headway (frequency) data
- 4) a sequence of links describing the route

The sources of travel demand are defined by the CTPS 592 zone structure for Eastern Massachusetts. The transit routes operated are defined as LINES, the type of transport operations as MODES, the facilities over which the system operates as LINKS, and intersections of LINKS as NODES. The location of NODES can be made using a base-map system where the local latitude axis can be

used as the X-axis and longitudes are considered to be perpendicular to and along the X-axis. This orthogonal network will approximate the latitude and longitude coordinate systems quite accurately and is of sufficient accuracy for this study. See Appendix D for further details on the Massachusetts State Plane Coordinate Map system.

ZONING SYSTEM. The zoning system is defined in terms of the 592 CTPS zones, which are equivalent to the 1970 census tracts with the exception of zones 116 and 117, which straddle the dividing lines between tracts 815 and 817 and tracts 817 and 819, respectively. The zones cover an area extending north to the New Hampshire border, south to the vicinity of Plymouth, and west nearly to Worcester. Outside of the area adjacent to or within Route 128, the zones are almost always one zone to a community, even in dense areas such as Lawrence, Haverhill, Lowell, and Brockton. The center of activity for each zone is represented by a point termed the centroid. An indication of the distribution of the CTPS zones is given below:

<u>Area within Eastern Massachusetts</u>	<u>CTPS Zone Numbers</u>
Downtown Boston	1-60
Core Area	61-192
Logan Airport	193
Chelsea	194-199
Cambridge	200-229
Somerville	230-244
Brookline	245-256
Outside Core Adjacent to Route 128	257-479
Outside Route 128 within MAPC	480-541
Outside of MAPC within Eastern Massachusetts	542-592

LINES. The transit line describes a route and its level of service with mode designation, line number, headway, and sequence of transfer points. **MODES.** Eight modes are available for the UTPS user. Modes 1, 2, and 3, classified as non-transit, are used as the walk link, auto penalty, and the auto-access link, respectively. Modes 4 through 8 are designated as flexible public transport, and in the 1980 transit network program are designated as follows:

<u>Mode</u>	<u>Transit Service</u>
4	Commuter Rail
5	Rail Rapid Transit
6	Non-MBTA Bus
7	MBTA Bus & Trackless Trolley
8	MBTA & Private Express Bus

LINKS. The link defines the path of a particular transit line between two nodes, which link is given by the nodes at each end of the link, the distance between the nodes, the mode or modes which operate over this particular link segment, and the time required to traverse the link for the specified route. Hence, for a transit link, the nodes can be points of accessibility or transfer for the specific line. In a similiar manner the non-transit links allow access to the transit network from zone centroids by the use of the walk link, MODE = 1. This method allows the coding of access to the transit systems in the dense service areas where the numerous centroids could be connected to several transit modes. The centroid connectors to the transit system represent a step in the direction of actual representation of how riders reach their destination or how they leave their origin in the CBD to reach some transit mode. Travel times on walk links are assigned based upon a speed of three m.p.h. (264 ft./min.) up to distance of 2,750 feet (an approximately 10-minute walking transfer between modes). The auto connector links represent access by private vehicle to the public transport system. These links are often required in the outer towns of the Eastern Massachusetts region, where the transit mode is either commuter rail or bus (private carrier or MBTA). An auto penalty, MODE=2, can be used for a park-ride or kiss-ride condition, simulating penalty times, unusual transfer conditions, and other purposes required for simulation.

Earlier versions of UNET allowed the use of multiple links whenever one link exceeded one or more limit conditions imposed by UNET. The three key words in the &PARAM are as follows:

- MAXTIME - maximum coded link time in minutes (25.5 minutes)
- MAXDST - maximum link distance in miles (25.5 miles)
- MAXSPD - maximum link speed in miles per hour (maximum coded is 255 m.p.h. and the default value is 60 m.p.h. as used in this report)

The above limit conditions occur in some of the AUTO CONNECTORS (MODE=3), which connect to the AUTO PENALTY (MODE=2), through to the CENTROID. The other end of the AUTO CONNECTOR is usually

terminated at a TRANSIT STATION (MODE=5), TRAIN STATION (MODE=4), or to a bus stop along the roadway (MODE=7 or 8). Since actual speeds on the highway are usually much lower than the 60-m.p.h. limit, especially during the peak hours, the maximum distance or time to be specified on the link must be much less than either MAXTIME or MAXDST. The relationship can be shown by the equation: $\text{TIME(MINUTES)} = 60 ((\text{DISTANCE IN MILES})/(\text{SPEED IN M.P.H.}))$

Both the speed over a highway link and the distance between any two points are fixed. The time must be checked so as to not exceed the limit allowed. For long distances, this limit is usually exceeded and the link must be split into two or more links in order to meet the UNET maximum specified. Later versions of the UTPS program UPATH have a NONTRANSIT LINK AGGREGATION feature which combines these near-maximum time or distance links into a single link which usually exceeds the specified maximum. The message given is as follows:

PAT72300 (INFORMATION): While reading and storing the network, ___ links were found with an impedance greater than the maximum (819). REPORT2 will be flagged with an *.
(NOTE: In QNET80, REPORT2 is on the order of 150 pages of computer printout.)

The question arises of how the walk time for a particular zone should be determined in order to account for the total population to be handed onto the transit system. Most transit riders come from a rather narrow strip segment of the population surrounding the transit line or lines. However, this walk time does not represent the total zone walk time to the transit system. A suggested method is to use the walk time from the centroid in order to represent the walk times for all the population rather than to use a maximum walk time of those who cluster near the transit lines. Different methods for determining walk times may be developed as use of the transit networks progresses.

NODES. The nodes represent the two ends of a link. Nodes are points in the transit network where transfers can be made from one line or mode to another line or mode. However, not all intersections, transit stops, and stations need be nodes in the simulation system.

4.0 DESCRIPTION OF THE TRANSIT SERVICES CODED

4.1 COMMUTER RAIL (MODE 4)

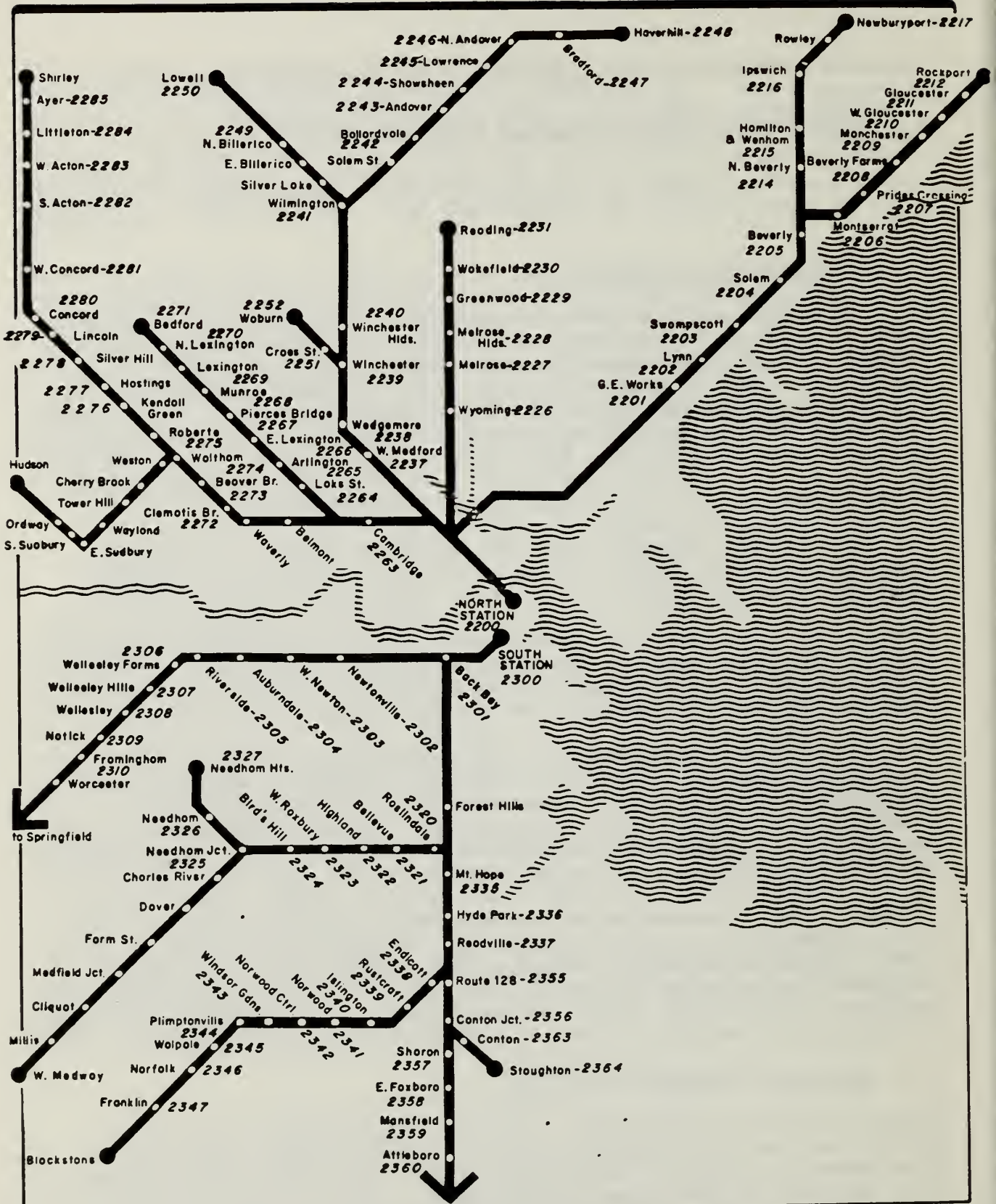
As it stands now, the coding of commuter rail services is based upon timetables dating back as far as 1976. This coding will be updated, as much has changed since then. In its present state the network reflects operations by Penn Central from South Station to points south and southwest of Boston and by the Boston and Maine Corporation (B&M) from North Station to points north and northwest of Boston. All commuter rail operations are listed as Mode 4. In Appendix section C.3.2, CTPS.QNET80.MODEN.LISTED.LINES, there are 21 lines listed for commuter rail.

The Penn Central service includes 16 lines along 5 different branches starting at South Station, with termini at Framingham, Needham, Needham Heights, Franklin, Providence, and Stoughton. Although Providence is not included within the boundaries of the inventory, it is used to indicate the route over which the particular line operates as far as Attleboro. Additional service also includes Canton Junction and Readville Junction as termini. Only the Norwood-to-Boston line is coded as two-way line.

The B&M service represented in the inventory consists of 21 lines from North Station to Rockport, Ipswich, Reading, Lowell, Woburn, West Medford, Winchester, Beaverbrook and Clementis Brook, Haverhill, and South Acton. Of the 21 lines represented, 13 are one-way lines along the 7 different branches either into Boston for the AM peak runs or out of Boston during the PM peak, as well as an express train from Woburn to Boston. Eight lines have a two-way line representation between Boston and the various termini. Figure 4-1 shows the commuter rail system and the CTPS node numbers assigned to the stations. There are two nodes assigned to Back Bay Station, 2301 and 2311, which represent the outbound and inbound nodes, respectively. Two nodes are assigned to prevent unloading or loading during inbound and outbound runs.

4.2 RAIL RAPID TRANSIT (MODE 5)

Mode 5 is used to represent the rail rapid transit portion of Massachusetts Bay Transportation Authority (MBTA) operations. This mode includes the following lines. The Red Line operates from Harvard to Braintree and Mattapan. The Braintree Branch was a committed line in the late 1970s and has been included in the 1980 transit network. The Blue Line goes from Bowdoin to Wonderland. The Orange Line runs from Forest Hills to Oak Grove



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COMMUTER RAIL LINES
WITH
CTPS NODE NUMBERS

CTPS
FIGURE
4-1

and the Green Line from Lechmere to Riverside, Boston College, Cleveland Circle, and Arborway. The lines are shown schematically in Figure 4-2, with node numbers assigned to each station. Some station numbers have been assigned to stations no longer used today.

There are 9 CTPS lines listed under Mode 5 in Appendix section C.3.2; all lines are operated as two-way lines.

4.3 NON-MBTA LOCAL BUS (MODE 6)

This inventory includes all of the scheduled bus routes operating into and around the Eastern Massachusetts region. We have made sure of including all possible routes by cross-checking numerous sources of data. Field trips were made whenever advisable. This mode required a considerable data-collection effort to determine fully the routes used and schedules of operations, and considerable analysis, because the route data were obtained in various formats. The routes were developed from company time tables which listed stops and frequency of operation. Difficulties in determining the routes or other information needed were resolved by telephoning the company.

Along with company data, CTPS was able to obtain from the Department of Public Utilities, through a request by the Massachusetts Bay Transportation Authority, information relating to individual route certificates as filed by certain of the scheduled common carriers. These certificates provided much of the information required. A fairly complete set of 1977 certificate information on nearly all the pertinent carriers in the Eastern Massachusetts region was obtained and is on file. The DPU also provided CTPS with an inventory of all carriers certified by the DPU at that time. This listed several hundred carriers, including school bus operators, charter companies, and other non-carriers. All the names were screened, a final list was determined, and each carrier was checked as to whether or not it operated on a scheduled basis.

The private bus carrier inventory includes 20 local bus companies operating routes represented by 115 different CTPS lines in Mode 6. See Appendix section C.3.2. Other non-MBTA buses are found in Mode 8, the express bus inventory.

4.4 MBTA LOCAL BUSES AND TRACKLESS TROLLEYS (MODE 7)

MBTA local bus and trackless trolley operations are the largest mode in the inventory. A considerable amount of data is available for these routes, much of it on the standard MBTA map of the region, which depicts routes and includes a chart showing the trip times and frequencies for rush hour, day, night, Saturday, and Sunday operation. (See Appendix A.4 for details about maps.) Other data included the MBTA's individual schedules



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MBTA RAIL RAPID TRANSIT LINES
WITH
CTPS NODE NUMBERS

CTPS

FIGURE

4-2

of operation and the timetable cards it issues that list schedules and provide a route map of each route or routes.

All these MBTA references were used to obtain the necessary data for the LINK and LINE cards. Routes which closed to form a loop circuit were divided into two one-way routes to comply with the UNET rules. In some instances a local MBTA bus route was categorized as express; for example, if it started from the suburb as a local and then proceeded to the CBD as an express. These lines are listed in Mode 8.

In Appendix section C.3.2, all the routes for Mode 7 included in this inventory are listed. The first set in the listing is in CTPS number sort, in column 2-4, while the second set is sorted on MBTA route number in column 63-69 and includes a number of other identifications, as necessary. Thus, these two sets may be used to determine the relationship between CTPS line number and MBTA route number.

All MBTA routes that had more than one or two scheduled runs in any period were included in this inventory. There are 227 lines listed under Mode 7; they represent 182 MBTA bus routes, some operated as one-way routes and some as two-way. Additional route information may be found on the CTPS transit inventory maps.

4.5 EXPRESS BUSES, MBTA AND PRIVATE (MODE 8)

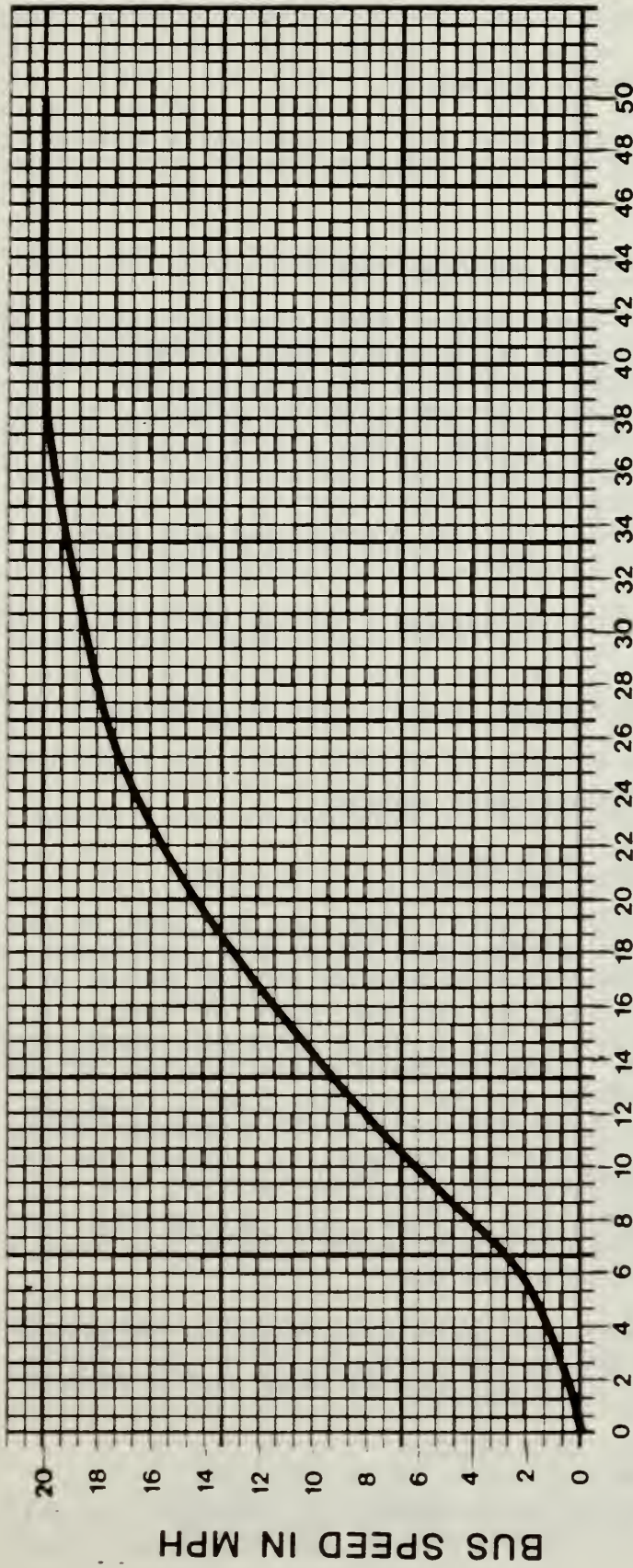
All express buses which operate into and out of the Boston CBD are grouped together as Mode 8 transit lines. These buses may operate as a local in the suburb but, as they approach the CBD, assume the character of an express bus into CBD. Some of the buses make more than one stop within the CBD, usually to discharge passengers to the transit lines or to take on passengers as outgoing buses to the suburbs. No local passengers are carried within the CBD area or in the suburbs where these buses operate.

The present system of MBTA and private buses operates such that, in the MBTA area, only MBTA buses operate as local buses. Thus all private buses operating into the CBD are express from about the Route 128 area to the CBD (the Essex Street terminal near South Station, the Greyhound terminal, the Park Square Trailways terminal, or the Haymarket terminal). (One bus, run by Ritchie Bus Company, operates to the vicinity of Park Square, but does not use any terminal.)

A complete list of all lines coded as express bus is given in Appendix C, section C.3.2. Of the 81 lines listed, there are 10 listed as two-way, whereas 71 are treated as one-way due to the routing or since they may only operate once in a particular time period. MBTA buses account for 23 lines, while 68 lines are private bus operations.

4.6 BUS SPEED DETERMINATION

The CTPS highway network was used to determine the various bus speeds on particular links. A description of the highway network may be found in reference (18). The procedure used was a special program that compares input node sequences with specified node sequences from the highway network. The speed determined from the highway network was then factored according to the relationship given by UTPS between highway auto speed and bus speed, shown in Figure 4-3. The speed or time determined in this manner provided the input for the bus links.



HIGHWAY CAR SPEED IN MPH

CTPS

FIGURE
4-3

SUGGESTED BUS SPEED AS A FUNCTION OF HIGHWAY SPEED

User's Guide to
CTPS Transit Network

Technical Report 49
April 1985

5.0 USER'S GUIDE TO TRANSIT NETWORKS

5.1 OUTLINE OF USER'S GUIDE INFORMATION

The previous sections of this report detailed the basic inventory of scheduled transit services within the Eastern Massachusetts region and discussed the various data sets developed. In this section, the methods that may be employed to produce the card data set of COORDINATES, LINKS and LINES are discussed. The appendices present further details of the data sets and note other related data necessary to understanding and using the transit inventory. The contents of the appendices are summarized in the introduction to this report.

Among the references listed in Appendix A, of particular importance are:

- (1) UTPS REFERENCE MANUAL, specifically program units UNET and UPATH
- (2) UTPS NETWORK DEVELOPMENT MANUAL

5.2 COPYING AND CREATING DATA SETS

IEBGENER is the IBM Utility Program that can be used to copy sequential data sets. It can be used to create individual data sets on either disk or tape from a source set of cards or to copy data sets from a disk or tape to another disk or tape. A typical set-up is shown in Appendix E for a card data set used to create a new data set on a disk. This example shows how an original base data set such as QNET80 can be copied from a tape to, for example, a newly created data set on a disk. Another example of IEBGENER use can also be found in Appendix E, under the step called STEPHEAD, which creates the heading section for the UNET program as a temporary data set. Thus, one can create one's own UNET data set from original cards or copy a data set from a library data source for one's own use.

The three typical data set-ups, with stepnames of STEPCOOR, STEPLINK, and STEPLINE, are shown in Appendix E and are used to create the data set from card input.

5.3 MODIFYING DATA SETS

A number of ways are available to modify or replace an existing data set. To replace a particular data set requires creating a

new replacement data set, as explained in Section 5.2. In most instances, only a few cards need be changed to create a modified data set. However, the QNET80 data sets number over 10,000 cards of links, lines, and coordinates and are not readily available in card output format. There are a number of methods available to change/replace a portion of the data set without re-creating the entire data set. These methods will be discussed in the following sections.

5.3.1 UNET Editing Process

The UNET program has an update feature in the LINK card in Column 12, where an update code of blank = add the link, and non-blank = delete the link. A similar column exists in the LINE card in Column 9, the DIRECTIONCODE, ususally coded as 1 = one-way, 2 = two-way, and 0 = delete line. There is no procedure available in UNET to change a COORDINATE card in similar manner as for a LINK card.

5.3.2 UPNET Program Editing Process

There are some CTPS programs available which may be used to modify these data sets. One such program is UPNET, which may be used to modify coordinate cards as well. The UPNET format is much like the UNET format, and is as follows:

COORDINATE EDITING OPTION IN COLUMN 9

BLANK - ADD COORDINATE TO DATA SET

R - REPLACE COORDINATE AND OLD DATA SET WITH THIS ONE

D - DELETE COORDINATE FROM DATA SET (COLUMNS 1-9 NEED ONLY BE CODED, THUS "4" AND NODE NUMBER ARE NEEDED)

LINK EDITING OPTION IN COLUMN 12

BLANK - ADD LINK AB TO NETWORK

R - REPLACE LINK AB IN OLD NETWORK WITH THIS ONE

D - DELETE LINK AB FROM NETWORK (COLUMNS 1-12 NEED TO BE CODED, "1", ANODE, BNODE, UPDATE CODE)

LINE EDITING OPTION IN COLUMN 9. LINE CONTINUATION CARDS SHOULD BE CODED AS FOR UNET, WITH THE EDITING OPTION IN COLUMN 9 THE SAME ON ALL CARDS.

0 (Digit Zero) - DELETE THE LINE FROM OLD NETWORK (ONLY ONE CARD, WITH COLUMNS 1, 4-7, 9 CODED, IS NEEDED TO DELETE A LINE, EVEN IF THAT LINE IS CODED ON SEVERAL CARDS IN THE OLD NETWORK)

1 - ADD THIS ONE-WAY LINE TO NETWORK

- 2 - ADD THIS TWO-WAY LINE TO NETWORK
- 3 - REPLACE OLD LINE OF THIS MODE AND NUMBER WITH THIS ONE-WAY LINE
- 4 - REPLACE OLD LINE OF THIS MODE AND NUMBER WITH THIS TWO-WAY LINE

Other details may be found in the original write-up of UPNET.

5.3.3 Alternative Method of Editing Data Sets

The previous two methods shown can be used to edit existing data sets. If large numbers of edits are desired, it may be desirable to obtain card output and modify the card output to retain as an original data set. It is usually not necessary to reproduce the entire 10,000 card data set, as an output of only a few cards is needed to make a large number of card changes.

There is a method of systematically creating smaller data sets which was helpful during the creation of the original data set. In Appendix E, the program procedure outlined to concatenate a number of data sets to create one large data set is shown.

In a similar manner, a number of smaller data sets may be created and then concatenated to produce the COORDINATES, LINKS, and LINES data set, as long as the data sets are compatible with UNET requirements. The only data which must be in SORT are those in the LINES data set. This data set must be in MODE and LINE NUMBER SORT. All links and coordinates need not be in SORT sequence, although COORDINATES must precede LINKS and LINKS precede LINES.

Another valuable program is RECMNG, which is a program that reads EBCDIC records up to 250 bytes in length and allows the user to select certain records on the basis of key bytes which the coder selects. Up to four different bytes may be coded to select the desired records for any single run. In some cases, it is desirable to use RECMNG more than once on a specific data set to select or eliminate the desired records. For example, it is quite simple to separate the coordinate, link, and line records into separate data sets by using the RECMNG program first on BYTE1(1)='4' for selecting coordinates, and similarly setting BYTE1(1)='1' for links, and '2' and '3' for line records. Once these data sets are created, further selection of records is possible simply by rerunning the RECMNG program. Thus, selecting BYTE1(13)='1' will select all MODE=1 links from the links-only data set. Note that this could be done with one RECMNG run, but would require more CPU since a greater number of record comparisons would be processed.

Hence, RECMNG may be used to break down the links data set into smaller data sets such as MODE=1 links, MODE=2 links, etc. These data sets may generally consist of about 100 cards or so, and

could be punched out in card format for corrections and/or changes or printed out for study if one desires to do so. UNET or UPNET may also be used to edit the data set, as was discussed in sections 5.3.1 and 5.3.2, respectively.

5.4 USING THE UNET PROGRAM

Once the link and line data sets or files are created, the network may be tested using the UNET program unit. The coordinate data set is not required as long as the plot program is not called. Using the UNET program, certain errors in the links and lines can be ascertained and the proper corrections made. When an error-free UNET network has been obtained, further analysis of the network can be carried out, such as the use of program UPATH to determine minimum paths.

The first section of the set up example for the UNET/UPATH program shown in Appendix E contains a series of JCL cards for scratching an old data set prior to creating a new one in its place. This is a precautionary step to prevent inadvertently aborting the run. The heading section to UNET is given in STEPHEAD, which consists of two comment cards, and &PARAM, &OPTION, &SELECT, and &DATA cards, in that order. The &DATA heads the data set of coordinate cards (if required) and the link and line data sets. These three (or two) data sets, constitute the input required to run UNET under statement:

```
//UNET.FT005F001 DD DSN=&XNET,UNIT=FDISK,DISP=(OLD,PASS),  
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=7200)
```

After UNET has created the network, all previous information is now stored in the files FT01F001-FT01F005, and the original input data is no longer required. Whenever a test run indicates an error-free UNET run, the above files should be retained for use in UPATH. This requires that DISP=(NEW,PASS) be reset to DISP=(NEW,KEEP), and the program UNET must be rerun to create the permanent files.

5.5 USING THE UPATH PROGRAM

Once an error-free UNET run is obtained, further tests may be made using other options of the UNET program and other UTPS programs. One can proceed to the phase of determining the shortest interzonal transit paths. This is done using the UTPS program UPATH. The program set-up is shown in Appendix E after the UNET program set-up. This program starts with the scratching of old UPATH files which may have the same name as the new UPATH file to be created. It includes creating the PATH files on FT09F001, the LINKFILE on FT12F001, the ALOCFILE on FT13F001 and, for example, the FARES file on FT11F001. The input to UPATH is on files already created by UNET and reset for use on UPATH starting with FT01F001 for UNET LINES, FT02F001 for the FREQUENCY

TABLES, FT03F001 for UNET LINKS, and FT04F001 for the ANODE TABLE. These details and other information may be found in the UTPS program write-up, reference (1).

Note that the sample set-up is again overriding the UPATH procedure and any override should include //UPATH.FT01F001 etc. for FT01F001 register, for example. Under the //UPATH.SYSIN etc., we see a similar set up as in UNET with the two comment cards and &PARAM, &OPTION, and &SELECT cards also included.

It should also be noted that in the statement for EXEC UPATH a TIME=1400 has been included. This setting prevents the UPATH program from stopping due to a time limit on developing interzonal paths. A typical run may take 2 to 3 hours of CPU to determine the 592 interzonal paths. It is further suggested that the final paths be put on tape for safekeeping and to release a large amount of space on the computer; something on the order of 335,000 bytes of space was required, in the case of QNET80.

APPENDICES

A. REFERENCES

A.1 UMTA AND FHWA REFERENCES

The following selected UMTA references are taken from the UMTA and FHWA report, Urban Transportation Planning System: Introduction, May 1976. For additional details and other references, see this document.

- 1) UTPS Reference Manual, April 2, 1979. Provides information on the function and use of the UTPS programs.
- 2) UTPS Network Development Manual (on UTPS tape). Covers transit network coding for use in UTPS programs.
- 3) Traffic Assignment, FHWA, August 1973. Available from FHWA, HHP-22, Washington, D.C. 20590. Covers aspects of traffic assignment and some network coding issues.
- 4) Introduction to Urban Travel Demand Forecasting, UMTA, March 1974. Summary, NTIS, PB 236-848/AS, \$9.25. A comprehensive instructional text on modern demand-modeling approaches, with case studies in application.
- 5) Guidelines for Trip Generation Analysis, FHWA, June 1967 (Reprinted April 1975.) Available from FHWA, HHP-209, Washington, D.C. 20590.
- 6) Calibrating and Testing a Gravity Model for Any Size Urban Area, FHWA, October 1965. (Reprinted March 1975.) Available from FHWA, HHP20, Washington, D.C. 20590.
- 7) Introduction to Urban Travel Demand Forecasting, UMTA, March 1974. Volume II--Evaluation, NTIS, PB 236-845/AS, \$4.75.

A.2 SELECTED GENERAL REFERENCES ON TRANSPORTATION

- 8) Behavioral Travel-Demand Models, Peter R. Stopher and Arnim H. Meyburg.
- 9) A Guide to Models in Governmental Planning and Operations, Office of Research and Development, Environmental Protection Agency, Washington, D.C. 20450, August 1974. Chapter 7, "Models in Transportation," by Kenneth W. Webb, Frank L. Spielberg and Peter S. Lorebal.

- 10) Fundamentals of Transportation System Analysis, Marvin L. Manheim, 1975 Edition.
- 11) Principles of Urban Transport System Planning, B. A. Hutchinson, Script a Book Company, Washington, D.C., 1974.
- 12) Passenger Transport Demand in Urban Areas, Methodology for Analyzing and Forecasting, A. Bonnafous, B. Gerardin. Report of the Thirty-Second Table on Transport Economics, held in Paris on December 4 and 5, 1975, European Conference of Ministers of Transport.
- 13) An Introduction to Urban Development Models and Guideline for Their use in Urban Transportation Planning, Will Terry Moore, Fredic J. Ridel, and Carlos A. Rodriguez, U. S. Department of Transportation, Federal Highway Administration, Office of Planning, Urban Planning Division, October 1975.
- 14) Transport Planning Models: The London Experience, B. V. Martin, Highway Research Record No. 309, Highway Research Board, Washington, D.C., 1970.
- 15) "Models in Urban Planning: A Synoptic Review of Recent Literature," A. G. Wilson, Urban Studies, Vol. 5, No.3, pp. 249-276, 1968.
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- 17) Transportation and Traffic Engineering Handbook, Institute of Traffic Engineers, John E. Baerwald, Editor. Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1976.
- 18) TASK I, 1963 Highway Network Development, Final Report, Michael R. Birdsall, Dennis L. Hinrichs, and Lawrence H. Tittlemore, Peat, Marwick, Mitchell & Company, August 16, 1972 MDPW I.009 4608:4614 02 06 01 44.
- 19) AMV Preliminary Network Data, Transit Network Development-- Technical Report, Job 603-110, M. Golenberg, June 20, 1975, Alan M. Voorhees & Associates, Inc.

A.3 SPECIAL REFERENCES

Comprehensive Traffic and Transportation Inventory, Wilbur Smith and Associates, 1965, for the Boston Regional Planning Project.

Coding Manual, (Dwelling-Unit Survey, External-Cordon Survey, Truck Survey, Taxi Survey), Wilbur Smith and Associates, 1964, for the Boston Regional Planning Project.

Street Coding Index, Wilbur Smith and Associates, 1964, for the Boston Regional Planning Project.

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Census of Housing: 1970 (Block Statistics), Final Report, HC(3)-111, Fitchburg/Leominster, Mass. Urbanized Area, U. S. Bureau of the Census.

A.4 SPECIAL COMPUTER-RELATED REFERENCES

JCL text:

System/370 Job Control Language, Gary DeWard Brown, Wiley-Interscience Publication, John Wiley & Sons, New York, 1977.

IBM JCL, PL/I and Fortran related documents:

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OS/VS1 JCL Services GC24-5100-1 file no. S370-36

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Fortran IV Programming, Wilfred P. Rule, Robert G. Finkenaur and Farrella Patrick, Prindle, Weber and Schmidt, Inc., Boston, Massachusetts, 1973.

CTPS Software Reference

"CTPS Software User's Guide" of CTPS programs available in the Program Library.

A.5 MAP REFERENCES

Official Transportation Map, issued by the Massachusetts Department of Public Works, 10 Park Plaza, Boston, Massachusetts 02116.

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Topographic Maps of Massachusetts, scale 1" = 2000 ft.,
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B. CODING FORMS USED IN TRANSIT INVENTORY

The three main coding forms required for UNET are:

- (1) coordinate data card
- (2) transit link data card
- (3) transit line data card

The coordinate data card is shown in Figure B-1. A "4" in column 1 distinguishes the coordinate data card. The node number is in columns 3-6, the x-coordinate in columns 13-20, and the y-coordinate in columns 23-30. Only columns 1-30 are used for the UNET coordinate data card.

The transit link data card is shown in Figure B-2 as taken from the UMTA manual. A "1" in column 1 distinguishes the link card from all other cards used in UNET. For full details, the user is referred to the UMTA manual on UNET, where a full discussion of the input quantities is given. Since the card uses only columns 1-62, columns 63-80 have been used for additional MODE 1 QNET80 link data. These include special information of value to some studies. Details on these data are presented in section C.3.1.

The transit line data card is the UMTA format for the UTPS transit line data, and is presented in Figure B-3. Note that column 1 is left blank, since either "2" or "3" may be used in this column: if the card does not refer to a previous line, then a "2" is used; if the card has reference to a previous line, then a "3" must be used in column 1. A complete set of line cards is shown in Table C-1, which lists all lines as represented in QNET80.

C. QNET80 EQUIVALENCY OF DATA SETS AND SUMMARY OF DATA SETS

C.1 CTPS.QNET80.LINKS AND COORDINATES

The transit link data card format is shown in Figure B-2. The format for the link data card is as follows:

<u>Column</u>	<u>Description of Item in the Column</u>
1	Link Card = 1
2-6	ANODE
7-11	BNODE
12	Update Code
13-17	Modes on Link (1 through 5)
18-21	Distance in Tenths of Miles
ANODE TO BNODE DATA	
22-24	A.M. Speed in Integer Miles per Hour or
25-27	A.M. Time in Tenths of Minutes
28-30	P.M. Speed or
31-33	P.M. Time
34-36	Off Peak Speed or
37-39	Off Peak Time
40	Set to 2 if twoway, otherwise blank
BNODE TO ANODE DATA WHEN DATA IS NOT TWOWAY	
41-62	Same as columns 18-39
63-72	Identification
73-80	Columns not used for link data (may be used for Carrier Name/Route Number)

The link data set at the present time constitutes 11,820 records and is available on special tapes to be transferred to the disk or to another tape for a data set build. Similarly, there are 6,523 coordinate cards defining the coordinates of the nodes used in this particular version of QNET80. These data are also stored on a specific tape and may be transferred as the need arises. The coordinate cards are not necessary if plots are not requested. For sample card setups, see Appendix E.

C.2 CTPS.QNET80.LINES

A complete list of the line cards is presented in Table C-1. Refer to Appendix B, Figure B-3 for each column represented. Line cards must be sorted as to mode number (column 4) and line number (columns 5-7). Thus the line cards are listed as mode 4, 5, 6, 7, and 8, with increasing line numbers for each mode. Furthermore, the highest line number allowed is 255, although line numbers need not be consecutive. The headway is given in columns 10-24 for AM, PM, MID, NITE and MINIMUM periods. The route description as a sequence of node numbers is given in columns 25-69. Column 72 is used to place a T to designate the end of the line card sequence. There can be no omissions in the node number sequence as far as each card is concerned. Finally, the line identification is given in columns 73-80; an abbreviation format suitable for 8 characters is shown. Further descriptions of the line may be found in Table C-3, which lists the individual lines and gives other pertinent information. The data set as shown constitutes the LINES portion of the data set for QNET80.

C.3 SUMMARY OF QNET80 DATA SET AND EQUIVALENCY

The data set QNET80 contains at this listing 19,167 80-byte records as follows:

Coordinate Records	6,523
Link Records	11,820
MODE 1	2,050
MODE 2	3,330
MODE 3	4,247
MODE 4	98
MODE 5	95
MODE 6	507
MODE 7	1,140
MODE 8	353
Line Records	822
MODE 4	51
MODE 5	18
MODE 6	177
MODE 7	387
MODE 8	189
"Nine" Records	2
TOTAL RECORDS	19,167

TABLE C-1 CTPS.QNET80.LINES

2 24	111620380900	2200	2202	2203	2204	2205	2206	2207	2208	2209	BOS-ROCK
2 24	121	2210	2211	2212							TBOS-ROCK
2 24	211405810999	2212	2211	2210	2209	2208	2207	2206	2205	2204	ROCK-BOS
2 24	221	2203	2202	2200							TROCK-BOS
2 24	311800385900	2200	2202	2203	2204	2205	2214	2215	2216		TBOS-IPSW
2 24	411400600990	2216	2215	2214	2205	2204	2203	2202	2200		TIPSW-BOS
2 24	512200200600	2200	2226	2227	2228	2229	2230	2231			TBOS-READ
2 24	611600	2200	2239	2241	2249	2250					TBOS-LONE
2 24	711210	2200	2252								TBOS-WOBU
2 4	811 350637	2200	2238	2239	2241	2249	2250				TBOS-LONE
2 4	911600 912	2200	2238	2239	2251	2252					TBOS-WOBU
2 4	1011446600820	2250	2249	2241	2239	2238	2200				TLOWE-BOS
2 4	1111198340825	2252	2251	2239	2238	2200					TWOBU-BOS
2 4	1211 250	2200	2237	2238	2239	2251	2252				TBOS-WOBU
2 4	1311380	2237	2200								TWMED-BOS
2 4	1412999999	2200	2263	2264	2265	2266	2267	2268	2269	2270	BOS-BEDF
2 4	1422	2271									TBOS-BEDF
2 4	1512999999	2200	2239								TWINCH-BO
2 4	1612999460	2200	2263	2286	2287						TBOS-BEAV
2 4	1712999999	2200	2253	2245	2247	2248					TBOS-HAVE
2 4	1811470 800	2200	2263	2272	2273	2274	2275	2276	2279	2280	BOS-SO.A
2 4	1821	2281	2282								TBOS-SO.A
2 4	1911 300	2200	2263	2272	2273	2274	2275	2276	2277	2278	BOS-SO.A
2 4	1921	2279	2280	2281	2282						TBOS-SO.A
2 4	2011 650800	2282	2281	2280	2279	2276	2275	2274	2273	2272	SO.A-BOS
2 4	2021	2263	2200								TSO.A-BOS
2 4	2111300	2282	2281	2280	2279	2278	2277	2276	2275	2274	SO.A-BOS
2 4	2121	2273	2272	2263	2200						TSO.A-BOS
2 4	3011999999	2300	2301	2302	2303	2304	2305	2306	2307	2308	BOS-FRAM
2 4	3021	2309	2310								TBOS-FRAM
2 4	3111 600	2300	2301	2302	2303	2304	2306	2307	2308	2309	BOS-FRAM
2 4	3121	2310									TBOS-FRAM
2 4	3211600	2310	2309	2308	2307	2306	2304	2303	2302	2301	FRAM-BOS
2 4	3221	2300									TFRAM-BOS
2 4	3311600800900	2358	2357	2356	2355	2337	2336	2335	2301	2300	TPROV-BOS
2 4	3411400 999	2356	2355	2301	2300						TCANJUNCT
2 4	3511600 999	2337	2301	2300							TREADVILL
2 4	3611999350999	2300	2301	2335	2336	2337	2355	2356	2357	2358	TBOS-PROV
2 4	3711999600	2300	2301	2355	2356						TCANTJUNC
2 4	3811999600	2300	2301	2337							TREADVILL
2 4	3911260 850	2327	2326	2325	2324	2323	2322	2321	2320	2319	NEED-BOS
2 4	3921	2301	2300								TNEED-BOS
2 4	4011 250850	2300	2301	2319	2320	2321	2322	2323	2324	2325	BOS-NEED
2 4	4021	2326	2327								TBOS-NEED
2 4	4111600 999	2347	2346	2345	2344	2343	2342	2341	2340	2338	FRAM-BOS
2 4	412	2337	2301	2300							TFRAM-BOS

2	4	4212999999	2342	2341	2340	2338	2337	2301	2300											TNORW-BOS
2	4	4311 600999	2300	2301	2337	2338	2340	2341	2342	2343	2344									BOS-FRAM
2	4	4321	2345	2346	2347															TBOS-FRAM
2	4	4411400600	2364	2363	2356	2355	2301	2300												TSTON-BOS
2	4	4511600400	2300	2301	2355	2356	2363	2364												TBOS-STON
2	15	112 40 40 75	1800	1801	1802	1803	1804	1805	1806	1807	1809									BLUE LIN
2	15	122	1810	1811																TBLUE LIN
2	15	212 45 45 85	1839	1838	1837	1836	1835	1820	1821	1822	1823									ORANGE L
2	15	22	1824	1825	1826	1827	1828	1829	1830											TORANGEX
2	15	312 55 55 90	1863	1864	1865	1845	1846	1847	1848	1849	1850									RED ASHM
2	15	322	1851	1852	1853	1854	1855													TRED ASHM
2	15	412110110110	1877	1878	1879	1880	1881	1882	1883	1920	1921									RIVSIDE
2	15	422	1922	1923	1924	1925	1926	1927	1928	1929	1930									RIVSIDE
2	15	432	1931	1932	1933	1934														T RIVSIDE
2	15	512 70 90 80	1880	1881	1882	1883	1944	1945	1946	1947	1948									ARBOR
2	15	522	1949	1950	1951	1952	1953													T ARBOR
2	15	612 75 75 70	1875	1876	1877	1878	1879	1880	1881	1882	1883									CLEVCIR
2	15	622	1920	1921	1905	1906	1907	1908	1909	1910										T CLEVCIR
2	15	712 75 75 70	1875	1876	1877	1878	1879	1880	1881	1882	1883									BC&LECH
2	15	722	1920	1921	1890	1891	1892	1893	1894	1895										T BC&LECH
2	15	812 30 30 80	1862	1861	1860	1859	1858	1857	1856	1871										TMATT-ASH
2	15	1012 55 55 90	1870	1869	1868	1867	1866	1850	1849	1848	1847									REDEXSOB
2	15	1022	1846	1845	1865	1864	1863													TREDEXSOB
2	6	111800750999	6424	2488	6425	2604	6426	2605	2310	6427	6428									TBWT-IN
2	6	211999750999	6428	6427	2310	2605	6426	2604	6425	2488	6424									TBWT-OUT
2	6	312600600600	1862	2405	6459	6460	6461	2431	6462	6463	2670									
2	6	322	2364																	TBHT-STOU
2	6	411300300300	1862	2405	6459	6460	6464	6465	2686											TBHT-PKWY
2	6	512600600600	1862	2405	6459	6460	6461	2431	6462	2363	6231				</					

2	6	1621		6622	6621	6620	6619	2423	5354	5892	6618	6617	ASHMONT-
2	6	1631		6600	6609	6601	2661	2662	6602	6603			TROCKLAND
2	6	1711	999999	6609	6600	6617	6618	5892	5354	2423	6619	6620	HUDSON
2	6	1721		6621	6622	5398	6630	5389	2428	6624	6201	6615	SO.WEY-
2	6	1731		6616	1855								TASHMONT
2	6	1811	999600999	1855	6616	6615	6201	6624	2428	5389	6630	5398	HUDSON
2	6	1821		6622	6621	6620	6619	2423	5354	5892	6618	6617	ASHMONT-
2	6	1831		6600	6609								TSO.WEY
2	6	1911	600750600	6609	6600	6604	2425	6605	5384	6606	5388	5389	HUDSON
2	6	1921		2428	6624	6201	6615	6616	1855				TSWEY-ASH
2	6	2011	400380600	1855	6616	6615	6201	6624	2428	5389	5388	6606	HUDSON
2	6	2021		5384	6605	2425	6604	6600	6609				TASH-SWEY
2	6	2111	999	5342	7141	5350	5349	6627	5892	5354	2423	6619	HUDSON
2	6	2121		6620	6621	6622	5398	6630	5389	2428	6624	6201	HINGHAM-
2	6	2131		6615	6616	1855							TASHMONT
2	6	2211	999	1855	6616	6615	6201	6624	2428	5389	6630	5398	HUDSON
2	6	2221		6622	6621	6620	6619	2423	5354	5892	6627	5349	ASHMONT-
2	6	2231		5350	7141	5342							THINGHAM
2	6	2311	999	5350	5349	6627	5892	5354	2423	6619	6620	6621	HUDSON
2	6	2321		6622	5398	6630	5389	2428	6624	6201	6615	6616	EAST.WEY
2	6	2331		1855									T-ASHMONT
2	6	2411	999	1855	6616	6615	6201	6624	2428	5389	6630	5398	HUDSON
2	6	2421		6622	6621	6620	6619	2423	5354	5892	6627	5349	ASHMONT-
2	6	2431		5350									TEAST.WEY
2	6	2512	600600600	6749	6750	6757	6758	5528	6029	6759	2498	6760	HL123
2	6	2522		5740	5878	6761	6762	6763	5744				THBL123
2	6	2612	300300300	5744	5743	5739	6764	6760	2507				THBL 79
2	6	2712	600750600	6770	6771	2338	6772	6773	6774	6775	6776	2409	HL 34
2	6	2722		5458									THBL 34
2	6	2812	600600999	2339	6766	2338	6767	6768	6769	2407	5868	6777	THBL 34
2	6	2912	600	2339	6766	2338	6767	6768	6769	6773	6774	6775	HL 34
2	6	2922		6776	2409	5458							THBL 34
2	6	3011	999750840	6826	6817	6816	6815	6814	6813	6812	6811	2212	ACTION 1
2	6	3021		6810	6809	6808	6807	6806					T ACTION 1
2	6	3111	999 999	6806	6807	6808	6809	6810	2212	6811	6812	6813	ACTION 2
2	6	3121		6814	6815	6816	6817	6826					ACTION 2
2	6	3212	999750600	6826	6822	2210	6823						T ACTION3A
2	6	3311	999750600	6806	6825	6824	2210	6822	6826				T ACTION3B
2	6	3412	999 999	6806	6807	6808	6819	6820	6821				T ACTION4A
2	6	3511	999 999	6826	6817	6818	2211	6807	6806				T ACTION4B
2	6	3611	600500840	6433	6546	6561	6865	6866	6867	6868	6869	6870	TMCL0-LA
2	6	3621		6871	6872	6873	6845						TTMCLO-LA
2	6	3711	600750840	6845	6873	6872	6871	6870	6869	6868	6867	6866	TMCLA-LO
2	6	3721		6865	6561	6546	6433						TTMCLA-LO
2	6	3811	600750600	6874	6875	6876	6877	6845	6878	6844	6879	6880	TMC LAW4
2	6	3821		6881									TTMC LAW4
2	6	3911	600750600	6881	6882	6879	6844	6878	6845	6877	6875	6874	TTMC LAW4
2	6	4011	600750600	6883	6884	6885	2245	6845	6878	6886	6887	6888	TTMC LAW3
2	6	4111	600750600	6888	6886	6878	6845	2245	6885	6889	6884	6883	TTMC LAW3
2	6	4211	600750600	6845	6878	6844	6843	6895	6896	6897			TTMC LAW2

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2 6 4612600750600	6899 6890 6840 6841 7130 6843 6844 6878 6845	TMC LAW5
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2 6 4812600750600	6900 6915 6916	TBOSC RED
2 6 4912600750600	6900 6915 6917 6918 6919	TBOSCBLUE
2 6 5011600750600	6900 6920 6921 6922	TBOSC GRE
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2 6 5211600750600	6900 6923 6924 6925 6926	TBOSC YEL
2 6 5311600750600	6926 6924 6923 6900	TBOSC YEL
2 6 5411600750600	6900 2248 6901 6904 6905 6906 6907 6903 6902	BOSC ORA
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2 6 5621	2508 2252 6415 2522 6438 2515 6437	TVOCCELL I
2 6 5711999999999	6437 6436 6417 2514 6435 2452 6434 2450 6555	VOCELL O
2 6 5721	6554 6433	TVOCCELL O
2 6 5811600300900	5332 6401 5209 5210 1945 7155 1946 5659 1947	WFB-OUT
2 6 5821	5660 1924 5609 5696 5608 5601 5608 5496 5488	WFB-OUT
2 6 5831	2412 6432 2307 6431 6200 6430 6429 2606 6428	WFB-OUT
2 6 5841	6427 2310	TWFB-OUT
2 6 5911300600900	2310 6427 6428 2606 6429 6430 6200 6431 2307	WFB-IN
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2 6 6312300300400	6505 6507 6513 6516 6517	TBAT-3
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2 6 6511300300400	6521 6520 6519 6518 6505	TBAT-4
2 6 6612300300400	6505 6518 6522 6521	TBAT-4A
2 6 6712300300400	6505 6523 6524 6526 2674	TBAT-5
2 6 6812300300400	6505 6507 6508 6527 6528 6529	TBAT-6
2 6 6912300300400	6505 6523 6530 6533 5395	TBAT-7
2 6 7012300300400	6505 6507 6513 6536 6515 6509 6534 6535	TBAT-8
2 6 7112300300400	6505 6507 6513 6537 6538 6539 6540	TBAT-9
2 6 7212300300400	6505 6507 6508 6527 6524 6541 6542	TBAT-10
2 6 7312300300400	6505 6523 6530 6531 6532	TBAT-11
2 6 7412230220370	6505 6506 2657 6543 5393 2658 5507 6544 2429	BAT-ASHM
2 6 7422	5381 2404 6545 1855	TBAT-ASHM
2 6 7512400300600	6546 6547 6548 6549 6550 6551	TLRT-702
2 6 7612270333500	6571 6553 6554 6555 2450	TLRT-703
2 6 7712480333560	6546 6547 6548 6552	TLRT-704
2 6 7812240300525	6546 7058 6557 6558 6559 2455 6560	TLRT-705

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2	6	8111	375600	6546	6561	6564	2696											TLRT706PM
2	6	8211	375525	2696	6563	6562	6561	6546										TLRT706PM
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2	6	8411300375467		6568	6565	6562	6561	6546										TLRT707-1
2	6	8512300375494		6571	6553	6556	6569	2451	6570									TLRT709
2	6	8612300429560		6571	6580	6581	6582	6572	6577	6576	6574	6575						TLRT710
2	6	8712300300271		6571	6553	6572	6577	6578	6579									TLRT711
2	6	8811300300525		6571	6580	6581	6582	6583	6584	6585								TLRT712-0
2	6	8911300300525		6585	6583	6581	6580	6571										TLRT712-1
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2	6	9111300375467		6571	6553	6586	6587	6588	6589	6590	6591							TLRT721-0
2	6	9211300300467		6591	6589	6588	6587	6586	6553	6571								TLRT721-1
2	6	9312600500840		6505	6518	6519	2669	6592	6593									TINT-STON
2	6	9411999999750		6505	6507	6513	6516	6517	6540	7050	2677	2678						INT-EAST
2	6	9421		7040	7041	7042	7043	7044	7045	7046								TINT-EAST
2	6	9511999999750		7046	7047	7048	7049	2675	6540	6517	6516	6513						INT-EAST
2	6	9521		6507	6505													TINT-EAST
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2	6	9622		6596	6597	6498	6598	2671	6603	6602	6610	7005						CROCKER
2	6	9632		7006	7007													TCROCKER
2	6	9712600		6505	6523	6524	6526	2674	6595	6599	6496	2672						CROCKER
2	6	9722		6594	6603													TCROCKER
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2	6	10422		7036	7037	7038	7039											PIERCE
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2	6	10612999600750		7057	7056	7053	2465	7054	7055									TMICHAUD
2	6	10712 40 40 40		1851	7150													THBLUMASS
2	6	10812100100100		1805	6805													TMASSPORT
2	6	10912300300600833		5342	5343	2400	6625	6626										THBL HULL
2	6	11012600999600		2310	6448	6782												TFRAM-TEM
2	6	11111999 999		2310	6427	6449	6451											TFRAM-SAX
2	6	112129999999999		6451	6427	2310												TSAX-FRAM
2	6	1131199999999		6451	6477	6479	6655	6449	6427	2310								TSAX-FRAM
2	6	1141199999999		2310	6448	6655	6479	6477	6451	6656								TFRAM-MAN
2	6	11511999 999		6656	6451	6678	6679	6479	6655	6449	6427	2310						TMAN-FRAM
2	6	11612999400999		2310	6448	6655	6479	6679	6685									TFRAM-NOB

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2 7 421	5205 5202 5203 1883	T68-1
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2 7 521	5322 1824	T49-3
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2 7 621	5307 5306 1826	T49-3
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2 7 721	5319 5318 5317 5331 5332 5206 5341 1846	T43-1
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2 7 1221	5314 5317 5318 5208 5207 1883	T9-4
2 7 1311 80 80150	1883 6033 1882 5317 5314 5315 5316 2692 1849	9-4
2 7 1321	5652 5647 5646 5650 5645	T9-4
2 7 1411 70 80150	5644 5643 5642 5649 5641 5640 5648 1849 2692	11
2 7 1421	5316 5315 5314 5322	T11
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2 7 1521	5649 5642 5643 5644	T11
2 7 1611220220	5866 5865 5864 5863 2691 5325 1848 5328 5329	6-1
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2 7 1922	5303 1826 2531 5668 1827	T8-4
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2 7 2221	6078 5658 2534 5659 1947 2535 5672 1922 1905	47-2
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2 7 2512150120240	1804 5215 5216 5222 2592 5218 5293 2588 5298	117-5
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2 7 2622	5729 5721 5722 5723 5715 5719 6036 1811	T 116-4

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2 7 2712300300300	1804 5215 5216 5222 2592 6409 5218 2595 5296	112-2
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2 7 4712600	2202 5569	T431
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2 7 9122	1891 5673 1890 6053 1921	T58
2 7 9212200250300	5688 5689 5684 5803 5685 5676 1908 5675 5667	65
2 7 9222	5666 1924 2537 2536 2535 5672 1921	T65
2 7 9311150150	5242 5246 1864	T67
2 7 9412150150300	1868 5352 5358 5359 5368 5360 2574 5378 5377	215-1
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2	716322	5274	1836								T101
2	716412120120200	5746	2237	5745	5744	5747	5752	2613	5282	5274	95
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2	716712070060150	2620	5264	5265	5278	2614	5281	5273	5274	1836	T89
2	716812 80 90170	5855	5859	2619	2618	2617	5263	5280	2615	5265	80
2	716822	5278	2614	5276	5272	5270	5238	5239	2632	1875	T80
2	716912450500450	5259	5279	5284	5271	5270	5272	5273	5274	1836	T90
2	717012450330500	5259	5279	5278	2614	5276	5272	5273	5274	1836	T94
2	717112 60100170	2620	5264	5259	5279	5284	5271	5270	5238	5239	88
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2	717712080180150	1863	5248	5233	5231	5227	5225	1875			T69
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2	717911150150300	5693	5692	5691	5690	5683	5699	5679	5680	2636	64
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2	718021	5831									T70
2	718111200250300	5831	5835	5836	2649	5682	5800	5681	2637	2636	70
2	718121	5245	1864								T70
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2	719111120100300	1863	5248	5254	5266	5841	5465	5842	5843	5844	84

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2 721712 450999	2204 5590 5910 5909 5908 5587	T453
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2 721822	5566 5565 6061 6062 2202	T454
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2 722012 600	2204 5590 5588 5589 6168	T457
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2 723021	5352 1868	NEW-3
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2 723121	5390	NEW-4
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2 723222	5391 5392 2426 5394 5395	NEW-5
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2 8 211150170	1883 6403 1934	T300-INBD
2 8 311 40 40	1934 6403 6405 5324 1847	T300-OUTB
2 8 411 40 40	1847 6405 6403 1934	T302-INBD
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2 8 811 70 50150	1847 6405 6403 5805 2648 5831	301-INBD
2 8 911 70 50600	5688 5689 5801 5693 2650 5819 6403 6405 5324	T301-INBD
2 8 921	1847	T301-OUTB
2 8 1011 70 50600	1847 6405 6403 5819 2650 5693 5801 5689 5688	T305-INBD
2 8 1111150200700	2274 5597 5824 5828 5830 6403 6405 5324 1847	T305-OUTB
2 8 1211150200700	1847 6405 6403 5830 5828 5824 5597 2274	

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2 8 1412 80 80	5746 2237 5745 5744 2612 1821	T325W.MED
2 8 1511150200600	2514 6417 2513 6415 2512 6416 2511 6418 5855	700-2 IN
2 8 1521	5857 7132 7133 1865 2694 6419 6863 6864 6862	700-2 IN
2 8 1531	5332	T700-2 IN
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2 8 1621	2511 6416 2512 6415 2513 6417 2514	T700-2OUT
2 8 1711250120	2514 6417 2513 6415 2252 5534 5538 5533 6026	701-INBD
2 8 1721	2500 2499 2612 1821 6863 6864 6862 5332	T701-INBD
2 8 1811250120	5332 6419 6863 1821 2612 2499 2500 6026 5533	701-OUTB
2 8 1821	5538 5534 2252 6415 2513 6417 2514	T701-OUTB
2 8 1911160300600	2202 6062 5561 5560 5548 2479 5545 5544 6066	426-INBD
2 8 1921	2483 2486 7164 2587 6838	T426-INBD
2 8 2011240110600	6838 2587 7164 2486 2483 6066 5544 5545 2479	426-OUTB
2 8 2021	5548 5560 5561 6062 2202	T426-OUTB
2 8 2112150 80600	2204 6056 7055 5558 2471 5570 5569 5568 5563	450
2 8 2122	5561 5560 2478 2484 6422 5718 2589 6420 6804	450
2 8 2132	6803 2593 6967 6838	T450
2 8 2512150150300	2202 6062 5561 5560 2478 2484 6422 5718 2589	400
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2 8 2911400999999	6439 2579 6440 2581 6441 2583 6442 2664 7162	RITCHIE
2 8 2921	2444 6444 6445 6446 5831 6408 6401 6945 5332	RITCHIE
2 8 2931	5323	TRITCHIE
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2 8 3021	2444 7162 2664 6442 2583 6441 2581 6440 2579	RITCHIE
2 8 3031	6439	TRITCHIE
2 8 3112600600600	2578 6778 2580 6779 2582 6780 6781 6782 6783	GREYLINE
2 8 3122	6219 6784 6785 6786 2584 2683 7179 7165 2442	GREYLINE
2 8 3132	6410 2665 6401 6945 5332	TGREYLINE
2 8 3211400	6780 6781 6782 6783 6219 6784 6785 6786 2584	GREYLINE
2 8 3221	2683 7179 7165 2442 6410 2665 6401 6945 5332	TGREYLINE
2 8 3311150	6785 6786 2584 2683 7179 7165 2442 6410 2665	GREYLINE
2 8 3321	6401 6945 5332	TGREYLINE
2 8 3411 100	5332 6945 6401 2665 6410 2442 7165 7179 2683	GREYLINE
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2 8 3511500750999	6211 6469 6470 6400 6471 6472 7168 7167 6473	ENGLANDR
2 8 3521	2437 2438 2695 2443 2442 6410 2665 6401 6945	TENGLANDR
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2 8 3621	6473 7167 7168 6472 6471 6400 6470 6469 6211	TENGLANDR
2 8 3711200999999	2410 6424 2684 6454 2518 6455 2685 6456 2625	BRUSH-HL
2 8 3721	6457 2553 6458 7181 2575 2577 2440 6412 2441	MILFORD-
2 8 3731	2442 6410 2665 6401 5332 5323	TBOSTON
2 8 3811600200999	5323 5332 6401 2665 6410 2442 2441 6412 2440	BRUSH-HL
2 8 3821	2577 2575 7181 6458 2553 6457 2625 6456 2685	BOSTON-
2 8 3831	6455 2518 6454 2684 6424 2410	TMILFORD
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2 8 4121	6862 5332 6945	TAMES-BOS
2 8 4211 380	6945 6419 6863 6838 2481 6704 6249 6718 7173	BOS-COM
2 8 4221	6717	TBOS-AMES
2 8 4311999	6731 7177 2460 7057 6705 2468 2481 6838 6863	HUDSON
2 8 4321	6864 6862 6945	TBEV-BOS
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2 8 4421	7177 6731	TBOS-BEV
2 8 4511 600	6945 6419 6863 6838 2481 2468 6706 7057 6705	HUDSON
2 8 4521	6733	TBOS-PEAB
2 8 4611400	6733 6706 7057 6705 2468 2481 6838 6863 6864	HUDSON
2 8 4621	6862 6945	TPEAB-BOS
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2 8 4721	6714 6732	TBOS-RUSL
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2 8 4821	6864 6862 6945	TRUSL-BOS
2 8 5011400600700	6840 6841 6842 6843 6844 6845 6846 6847 2243	TROMBLEY
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2 8 5131	6844 6843 6842 6841 6840	TLAWRANCE
2 8 5211600700840	6433 2454 6827 6828 6613 6614 7174 7175 6851	TROMBLEY
2 8 5221	6852 2502 2501 2500 2499 2612 1821 6863 6864	LOWELL-
2 8 5231	6862 5332	TBOSTON
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2 8 5331	6433	TLOWELL
2 8 5411999	6494 6495 2673 6496 6497 6498 2660 6707 6609	HL WHIT
2 8 5421	6600 6710 2424 6649 6676 6677 2682 6607 2573	TO ASHMT
2 8 5431	6201 6615 6616 1855	T
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2 8 5531	6496 2673 6495 6494	T
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2 8 5831	6603	T
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2 8 5921	2682 6607 2573 6608 2688 6984 6480 6504 2689	BROCKTON
2 8 5931	5323 6945	TTO BOSTN
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2 8 6111240600750	2432 6637 6638 2415 6639 6640 2417 6641 2421	P&B
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2 8 6231	6641 2417 6640 6639 2415 6638 6637 2432	T(BOS-PL)
2 8 6311400	6629 6404 6631 6632 2416 6633 6635 6636 2413	P&P
2 8 6321	6638 2415 6639 2418 2420 6642 2422 2424 6649	SOUTH
2 8 6331	6676 6677 2682 6607 2573 6608 2688 6984 6480	DUXBURY
2 8 6341	6504 2689 5323 6945	TTO BOSTN
2 8 6411 600	6945 5323 2689 6504 6480 6984 2688 6608 2573	P&B
2 8 6421	6607 2682 6677 6676 6649 2424 2422 6642 2420	BOSTON
2 8 6431	2418 6639 2415 6638 2413 6636 6635 6633 2416	TO SOUTH
2 8 6441	6632 6631 6404 6629	TDUXBURY
2 8 6511999 999	6634 6635 6636 2413 6638 2415 6639 6640 2417	P&B
2 8 6521	6641 2421 6642 2422 2424 6649 6676 6677 2682	MARSHFLD
2 8 6531	6607 2573 6608 2688 6984 6480 6504 2689 5323	TO
2 8 6541	6945	TBOSTON
2 8 6611 999999	6945 5323 2689 6504 6480 6984 2688 6608 2573	P&B
2 8 6621	6607 2682 6677 6676 6649 2424 2422 6642 2421	BOSTON
2 8 6631	6641 2417 6640 6639 2415 6638 2413 6636 6635	TO
2 8 6641	6634	TMARSHFLD
2 8 6711999	7171 6638 2415 6639 6640 2417 6641 2421 6642	P&B
2 8 6721	2422 2424 6649 6676 6677 2682 6607 2573 6608	PEMBROKE
2 8 6731	2688 6984 6480 6504 2689 5323 6945	TTO BOSTN
2 8 6811 999	6945 5323 2689 6504 6480 6984 2688 6608 2573	P&B
2 8 6821	6607 2682 6677 6676 6649 2424 2422 6642 2421	BOSTON-
2 8 6831	6641 2417 6640 6639 2415 6638 7171	TPEMBROKE
2 8 6911170750999	6643 6644 6645 6646 2419 6647 2446 6648 2421	P&B
2 8 6921	6642 2422 2424 6649 6676 6677 2682 6607 2573	SCITUATE
2 8 6931	6608 2688 6984 6480 6504 2689 5323 6945	TTO BOSTN
2 8 7011999180999	6945 5323 2689 6504 6480 6984 2688 6608 2573	P&B
2 8 7021	6607 2682 6677 6676 6649 2424 2422 6642 2421	BOSTON-
2 8 7031	6648 2446 6647 2419 6646 6645 6644 6643	TSCITUATE
2 8 7111600	2243 6848 6849 6850 6851 6852 2502 2501 2500	TROMBLEY
2 8 7121	2499 2612 1821 6863 6864 6862 5332	TANDV-BOS
2 8 7212600600600	6950 6951 6952 6955 6476 2773 6612 2682 6607	BONANZA
2 8 7222	2573 6608 2688 6984 6480 6504 2689 7106 6805	TFOX-LOGN
2 8 7311300999999	6500 6501 2679 6502 6503 2676 2377 2681 2667	ALMEIDA
2 8 7321	2680 6476 2773 6612 2682 6607 2573 6608 2688	BROCKTON
2 8 7331	6984 6480 6504 2689 6945	TTO BOSTN
2 8 7411999300999	6945 2689 6504 6480 6984 2688 6608 2573 6607	ALMEIDA
2 8 7421	2682 6612 2773 6476 2680 2667 2681 2377 2676	BOSTON-
2 8 7431	6503 6502 2679 6501 6500	TBROCKTON
2 8 7511600750999	6930 6931 6932 6933 6934 6935 6936 6937 6938	ABC106 I
2 8 7521	6126 6939 2408 2560 1830 6940 6941 6942 6943	ABC106 I
2 8 7531	6944 6945	TABC106 I
2 8 7611999750840	6945 6942 6941 6940 1830 2560 2408 6939 6126	ABC106 O
2 8 7621	6938 6937 6936 6935 6934 6933 6932 6931 6930	TABC106 O
2 8 7711400750	6749 6750 5528 6751 6831 2499 6857 2612 6859	HBL STON
2 8 7721	1836	TTO SULLV
2 8 7811400380	1836 6859 2612 6857 2499 6831 6751 5528 6750	HBL SULL
2 8 7821	6749	TTO STONH
2 8 7911240	2355 6955 6476 2773 6612 5389 2682 6607 2573	HUDRT128

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CTPS.QNET80.LINES.LISTED

CTPS

TABLE
C-1p

2 8 7921	6608 2688 6984 6480 6504 2689 6838	TTOHAY-KT
2 8 8011999	6707 6609 6600 6710 2424 6649 6676 6677 2682	HUDSON
2 8 8021	6607 2573 6608 2688 6984 6480 6504 2689 6838	TWEY-HAY
2 8 8112750750	6707 6609 6600 6710 5355 2423 5354 6619 6620	HUDSON
2 8 8122	6621 6622 5398 6677 2682 6607 2573 6608 2688	FACTPANT
2 8 8132	6984 6480 6504 2689 6838	TTOHAYMKT
2 8 8211999	6609 6600 6710 2424 6649 6676 6677 5376 5389	HUDSON
2 8 8221	6612 2682 6607 2573 6608 2688 6984 6480 6504	COL.SQ.
2 8 8231	2689 6838	THAYMARKT
2 8 8311999	6609 6600 6710 5355 2423 5354 6619 6620 6621	HUDSON
2 8 8321	6622 5398 6677 2682 6607 2573 6608 2688 6984	COL.SQ.
2 8 8331	6480 6504 2689 6838	THAYMARKT
2 8 8412999999	5342 7141 5350 5349 6627 2423 6619 6620 6621	HUDSON
2 8 8422	6622 5398 6677 2682 6607 2573 6608 2688 6984	HINGHAM
2 8 8432	6480 6504 2689 6838	THAYMRKT
2 8 8511 999	6838 2689 6504 6480 6984 2688 6608 2573 6607	HUDSON
2 8 8521	2682 6677 6676 6649 2424 6710 6600 6609	THAY-WEY
2 8 8611 999	6838 2689 6504 6480 6984 2688 6608 2573 6607	HUDSON
2 8 8621	2682 6612 5389 5376 6677 6676 6649 2424 6710	HAYMRKT
2 8 8631	6600 6609 6707	TTO FACTP
2 8 8711300	6411 2431 6461 6460 6459 6447 5381 5383 5378	BRUSHILL
2 8 8721	5377 6608 2688 6984 6480 6504 2689 5323 6945	TCANT-BOS
2 8 8811750	6945 5323 2689 6504 6480 6984 2688 6608 5377	BRUSHILL
2 8 8821	5378 5383 5381 6447 6459 6460 6461 2431 6411	TBOS-CANT
2 8 8911 240	6838 2689 6504 6480 6984 2688 6608 2573 6607	HODHAY-K
2 8 8921	2682 5389 6612 2773 6476 6955 2355	TTOTRE128

C.3.1 CTPS.QNET80.MODEN.LISTED.RENODEX

The nodes used for each mode are listed in Tables C-2-1 through C-2-8. A short summary of the number of records processed for each mode, the number of unused nodes, and the number of nodes used for each particular mode is given at the end of each mode from 1 to 8. The node numbers are summarized whenever continuous node numbers are used--1944-1953, for example; a single value is printed--2696, for example--whenever a node number is used but not in a continuous sequence.

MODE 1, which is the walk link, includes all nodes which have a walk link connection as well as all the centroids from which a walk link is used to connect a transit node. Note that not all centroids have a walk link connecting them to either a transit, bus, or railroad station; the indication is that the walk node link is much greater than 1/2 mile. These centroids are connected by auto connector to usually more than one transit, bus, or railroad station.

In MODE 2, the auto penalty portion of the auto connectors, the first 60 centroids, which are the CBD centroids, do not have any auto connectors. Centroids 61-592 all have at least one auto connector to either a transit, bus, or railroad station.

MODE 3 includes the nodes used for the auto connector links between the auto penalty and the transit, bus, or railroad station.

MODE 4 shows the railroad portion of the transit network. The railroad network is represented by 98 links using 93 separate nodes.

In MODE 5, the rapid rail mode, there are 95 links using 100 different nodes.

The private bus section of the transit inventory is represented by MODE 6. In this mode, 507 links using 465 separate nodes for 115 different lines are noted.

The largest number of lines is found in MODE 7, the MBTA bus and trackless trolley system, in which 227 lines are used, with 1,140 links using 940 different node numbers.

Express buses, both private and MBTA, are MODE 8, which has 333 links using 319 different nodes.

The MODE 1 links have additional data on nearly all of the walk links beyond the requirements for UNET. Except for a small number of links, which will be noted later on, all walk links are coded as two-way links; that is, column 40 on the transit link data card is set at "2." Thus, columns 41-80 are not used for the UNET building of the network. Some of these columns have been utilized to present other information used to determine the

 ctps.qnet80.summary.model1.listed.renod80

0001-0393 0396-0485 0488-0490 0492-0494 0499-0505 0507-0513 0516-0525 0527-0543
 0546 0548-0560 0562 0566-0568 0573-0574 0576 0582-0587 0589-0590 1800-1807 1809
 -1811 1820-1830 1835-1839 1845-1871 1875-1883 1890-1895 1905-1910 1920-1934 1944
 -1953 2200 2202-2212 2214-2216 2226-2231 2237-2239 2241-2243 2245 2247-2248 2250
 -2252 2263-2282 2287 2300-2310 2319-2327 2335-2347 2355-2358 2363-2364 2404-2405
 2411 2445 2450 2470 2477 2480 2487 2492 2509 2514 2519 2525-2526 2528-2529 2532
 -2537 2542-2544 2546 2548 2551-2552 2555 2557 2559 2561 2564 2569 2585-2586 2590
 2592 2595 2597-2603 2607 2610 2614 2617-2622 2639 2641-2642 2645-2646 2668 2686
 2690 2696 2699 5200-5203 5205-5225 5227-5247 5249-5250 5252 5254-5267 5269-5274
 5276 5278-5281 5283-5290 5293-5300 5303 5306-5308 5310-5315 5317-5325 5329-5335
 5337-5341 5348-5349 5351-5360 5362 5364-5366 5374 5377-5378 5380-5381 5383-5384
 5386 5388 5392-5395 5398-5400 5402 5404 5408 5410 5412-5421 5424-5429 5431-5434
 5436-5437 5439 5441 5443-5444 5446 5448-5452 5454-5455 5458 5462-5464 5467 5470
 5475 5478 5481 5485 5488-5489 5491-5501 5504-5506 5509-5512 5517 5519-5521 5524
 -5531 5533 5535-5574 5577 5579-5581 5583-5598 5600-5603 5608-5612 5614 5616 5618
 -5636 5638-5643 5646-5666 5668-5672 5674-5681 5685 5689-5690 5693-5701 5703-5721
 5723-5747 5750-5752 5800-5805 5807-5814 5816 5818-5829 5831-5838 5840-5841 5844
 -5845 5847-5849 5852-5859 5864 5902-5903 5906 5908 5910-5915 6004-6005 6011 6026
 6032 6036 6042 6057-6058 6066 6077 6088 6106 6125 6150 6209 6219 6229 6249 6404
 6409 6415-6418 6420 6422-6427 6429-6435 6439-6445 6448-6449 6451 6454-6459 6461
 -6464 6466-6471 6473-6475 6479 6483 6485-6486 6489 6492-6493 6495 6497-6503 6505
 6546 6566 6570-6571 6591 6593-6594 6597 6599-6601 6603-6606 6617-6619 6621 6623
 6625-6627 6629 6631-6638 6640-6648 6656 6678-6679 6700-6704 6717-6718 6731-6733
 6750-6751 6768 6770 6772 6774 6778-6782 6785 6805-6806 6823 6826 6838 6840 6845
 6848 6866 6869-6870 6875 6880 6882 6888 6891 6893 6899-6900 6913-6914 6918 6922
 6928 6930 6933-6936 6938 6945 6950 7005 7007-7008 7010 7017 7021 7030 7034 7038
 7042 7044 7049 7051-7057 7131-7134 7143 7150 7161 7171 7173

THERE ARE 2050 RECORDS IN THE FILE. THE NODES CHECKED ARE GIVEN BY-
 1 -8192
 THERE ARE 6679 UNUSED NODES IN THE RANGE CHECKED.
 THERE ARE 1513 NODES USED FOR THIS MODE IN THE RANGES CHECKED

 ctps.qnet80.summary.mode2.listed.renod80

0061-0592	1727	1730-1734	1737	1740-1769	1771-1774	1776-1793	1795	1797-1799	1812
-1819	1831-1834	1840-1844	1872-1874	1885-1888	1896-1898	1900-1903	1911-1919	1935	
-1938	1940	1942-1943	1954-1983	1985	1987	1989-2028	2031-2033	2035-2126	2129 2132
2134	2136	2138	2140	2143	2145	2148	2150	2152	2154 2156 2158 2161 2163 2165 2168
2170	2172	2174	2176	2178	2181	2183	2185	2187	2189 2191 2193 2196 2198 2201 2217
2219	2221	2223	2225	2233	2235	2240	2246	2255	2257 2259 2261 2283 2285 2289-2290
2292-2293	2295-2296	2298	2311	2313	2315-2317	2329	2331	2333	2348-2349 2351 2353
-2354	2361	2365	2367	2369-2371	2374	2376	2379	2382	2384 2387 2390 2392 2394 2397
2399	2402	2475	2491	2521	2566	2576	2663	2701	2703 2705-2706 2708 2710 2712 2714
2716	2718	2720	2722	2724	2726	2728	2730	2732	2734 2736 2738 2740 2742-2743 2745
2748	2750	2752	2754	2757	2759	2761	2763	2765-2766	2768 2770 2774 2776 2778 2781
2783	2785	2787	2790	2793	2795	2797	2799	2801	2804 2806 2808 2810 2812 2815 2817
2819	2822	2824	2826	2828	2830	2832	2834-2835	2837	2839 2841 2843 2845 2847-2849
2852-2853	2855	2857	2859	2861-2864	2866-2867	2869	2871-2873	2875	2877 2879-2884
2887-2889	2891	2893	2895	2897	2899	2901	2903	2905-2906	2908 2910-2911 2913 2915
2917	2920	2923	2929	2932	2934-2935	2937-2938	2941-2944	2947	2949-2951 2953 2955
2957	2959	2961	2965	2967	2969	2971	2973	2975	2977 2979-2980 2982 2984 2987 2990
2993	2999	3002-3003	3005	3007-3008	3010	3012	3014	3017	3020 3026 3029 3031-3033
3035	3037	3040	3046	3049	3051-3053	3056	3058	3060	3062 3065 3071 3074 3076-3078
3081	3084	3090	3093	3095	3097	3099-3100	3103	3106	3109 3115 3118 3120 3122 3124
3126	3128	3131	3134	3137	3140	3142	3145	3148	3151 3154 3156 3158 3161 3164 3167
3169	3171	3173	3175	3177	3179	3181	3183	3185	3187 3189 3191 3193 3195 3198 3200
3203	3206	3208	3210	3212	3214	3216-3218	3220	3222	3224 3226 3228 3230 3232 3234
-3235	3237	3239	3241	3243	3245-3247	3249	3251	3253	3255-3256 3258 3260 3262-3268
3270	3272	3274	3276-3277	3279-3283	3286	3288	3290	3292-3293	3295 3297 3299-3301
3304-3307	3310	3313	3315-3316	3319	3322-3324	3327-3329	3331	3333-3340	3342 3344
3346	3348	3350-3358	3360-3363	3365-3374	3376	3378	3380-3381	3383-3388	3390 3392
3394	3396-3401	3404	3406	3408	3410-3414	3416	3418	3420	3422-3423 3425 3427-3431
3433	3435	3437	3439	3441	3443-3451	3453-3466	3468-3471	3473-3475	3477 3479 3481
3483	3485	3487	3489	3491	3493	3495-3496	3498	3500	3502 3504 3506 3508 3510 3512
3514-3515	3517	3519	3521	3523	3525	3527	3529	3531	3533 3535 3537 3539-3542 3544
-3545	3547-3548	3550	3552-3553	3555	3557	3559-3565	3567	3569	3571-3574 3576 3578
-3580	3582-3600	3602	3604	3606	3608-3612	3614	3616	3618	3620-3623 3625-3627 3629
3631	3633	3635	3637	3639-3640	3642-3645	3648	3650-3653	3656	3658 3660 3662 3664
3666	3668-3671	3673	3675	3677-3681	3683	3685-3687	3689	3691-3694	3696 3698 3700
-3710	3712	3714	3716-3719	3721	3723-3725	3727	3729	3732	3735 3737 3742 3744-3748
3750	3752	3754	3756	3758	3762	3764-3765	3767	3769	3771 3773-3775 3777 3779 3783
3786	3788-3789	3791-3793	3796	3802	3805-3808	3810	3813	3819	3822-3826 3829 3832
3835	3841	3844-3847	3849	3853	3856	3859	3862	3868	3871-3875 3878 3881 3887 3890
-3905	3907-3909	3911	3913-3915	3917	3919-3923	3925-3929	3931-3935	3937-3940	3942
-3946	3948-3952	3954-3957	3959-3962	3964-3967	3969	3971	3973	3975	3977 3979-3988
3990-3996	3998-4010	4012-4086	4088	4090-4092	4094-4099	4101-4102	4104-4107	4109	
4111	4113	4115	4117-4124	4126-4131	4133	4135-4138	4140-4163	4165	4167 4169-4178
4180	4182	4184-4192	4194	4196	4198-4308	4311	4314	4317	4323 4326-4329 4331 4333
4336	4342	4345-4351	4353	4355	4357	4361	4363-4366	4368	4370 4372 4374 4376-4378
4380	4382	4384	4388	4390-4394	4396	4398	4400	4402	4404-4406 4408 4410 4412 4416

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CTPS.QNET80.SUMMARY.MODE2.LISTED.RENOD80

CTPS
TABLE
 C-2-2a

4418-4422 4424 4426 4428 4432 4434-4437 4439 4441 4443 4449 4452 4454-4456 4458
4460 4462 4466 4468-4471 4473 4475 4477 4481 4483-4486 4488 4490 4492 4494 4496
-4498 4500 4502 4504 4506 4508-4511 4513 4515 4517 4519-4521 4523 4525 4527 4529
4531-4541 4543 4545 4547-4558 4560 4562 4565 4571 4574-4579 4581 4583 4585 4589
4591 4593-4594 4596 4598 4600-4601 4603 4605 4607 4611 4613-4620 4622 4624 4626
4630 4632-4636 4638 4640 4642 4646 4648-4651 4653 4655 4657 4661 4664-4667 4669
4671 4673 4675 4678-4680 4682 4684 4686 4688 4690-4691 4693 4695 4697 4699 4701
-4703 4705 4707 4709 4711 4715 4717 4719 4721 4723 4725-4727 4729 4731 4733 4735
4739 4741 4743-4746 4748 4750 4752 4754 4756 4760 4762-4763 4765-4767 4769 4771
-4772 4774 4776 4778 4780 4782 4786 4788 4790 4792 4794-4795 4797 4799-4800 4802
4804 4806 4808 4810 4814 4816-4821 4823 4825 4827 4829 4833 4835-4840 4842 4844
4846 4850 4852-4859 4861 4863 4865 4869 4871-4886 4888 4890 4892 4896 4898-4908
4910-4923 4926 4928-4938 4940-4965 4967-4989 4991-4997 4999 5001-5005 5007 5009
-5015 5017-5051 5055-5059 5061-5063 5065 5067 5069-5073 5075 5077-5082 5084-5087
5089 5091 5093-5097 5099 5101 5103-5109 5111-5115 5117-5199 5204 5226 5251 5253
5268 5275 5277 5291 5301-5302 5305 5326-5327 5361 5369-5373 5382 5396-5397 5411
5422 5430 5438 5440 5445 5453 5456-5457 5473-5474 5476-5477 5508 5513-5514 5516
5518 5522-5523 5532 5575 5578 5582 5599 5605 5702 5753-5799 5806 5817 5839 5860
-5862 5869-5870 5872-5877 5879 5881-5887 5889-5890 5893-5896 5898-5899 5901 5916
-5919 5921-5926 5928-5932 5934-5937 5939-5944 5946-5949 5951-5968 5970-6001 6013
6017-6018 6027-6028 6047 6049 6063 6070-6076 6081-6082 6093-6094 6100 6103 6107
-6119 6122 6124 6130-6149 6151-6167 6170 6172-6178 6180 6182 6184 6188 6190-6199
6202-6208 6210 6212-6218 6220 6222-6228 6230 6232-6238 6240 6242-6248 6250 6252
-6258 6260 6262-6268 6270 6272-6373 6375-6380 6382-6387 6389-6399 6407 6413-6414
6421 6478 6525 6650-6654 6657-6664 6666 6668-6671 6674 6680-6682 6687-6690 6693
-6696 6699 6715-6716 6719-6721 6723-6726 6728-6730 6734-6748 6752-6756 6765 6787
6791-6801 6829-6830 6832-6837 6839 6853-6855 6861 6947-6949 6953-6954 6956-6962
6970-6977 6981-6983 6985-7004 7059-7068 7070-7104 7107 7109-7129 7135-7139 7142
7144-7149 7151-7154 7157 7163 7169-7170 7182-7224 7226 7228-7229 7231-7233 7235
-7236 7239-7241 7243-7244 7247 7249-7250 7252-7253 7255 7257-7258 7260 7262-7264
7266-7267 7270-7273 7277-7299 7301-7308 7310-7316 7318-7327 7329-7613 7616-7618
7621-7623 7627 7630-7632 7636 7639 7643 7646 7650-7651 7654 7656 7660 7666 7672
7678-7680 7684 7687-7689 7695-7697 7701 7704-7735 7739-7740 7744-7750 7754-7763
7767-7776 7779-7787 7791-7792 7796-7797 7801-7804 7808-7811 7815-7817 7821-7822
7826-7827 7833-7835 7839-7841 7845-7850 7854-7858 7862 7864-7866 7870 7872-7876
7880 7884 7890-7891 7897 7903-7904 7908 7912 7919-7920 7927 7933-7934 7938 7944
-7945 7949-7951 7958-7960 7964-7967 7971-7973 7977-7979 7983-7984 7988-7989 7995
-7997 8003-8005 8009-8012 8017-8020 8024-8027 8030-8032 8035-8037 8040-8041 8044
-8045 8048 8051-8052 8055-8057 8060-8062

THERE ARE 3330 RECORDS IN THE FILE. THE NODES CHECKED ARE GIVEN BY-

1 -8192

THERE ARE 4330 UNUSED NODES IN THE RANGE CHECKED.

THERE ARE 3862 NODES USED FOR THIS MODE IN THE RANGES CHECKED

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CTPS.QNET80.SUMMARY.MODE2.LISTED.RENOD80

CTPS

TABLE
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 ctps.qnet80.summary.mode3.listed.renod80

```

1725-1799 1804-1807 1809-1819 1825-1844 1848-1875 1884-1888 1890-1943 1945-2028
2031-2033 2035-2159 2161-2199 2201-2236 2238-2252 2254-2285 2288-2299 2301-2376
2378-2385 2387-2399 2401-2402 2414 2469 2475 2482 2491 2505 2507 2514 2521 2547
2566 2576 2623 2656 2663 2700-2772 2774-2895 2897-2906 2908-2911 2913-2923 2927
-2935 2937-2961 2964-2980 2982-2993 2997-3008 3010-3020 3024-3040 3044-3065 3069
-3084 3088-3109 3113-3737 3740-3758 3761-3779 3782-3796 3800-3813 3817-3835 3839
-3862 3866 3868-3881 3885-4317 4321-4336 4340-4357 4360-4384 4387-4412 4415-4428
4431-4443 4447-4462 4465-4477 4480-4565 4569-4585 4588-4607 4610-4626 4629-4642
4645-4657 4660-4711 4714-4735 4738-4756 4759-4782 4785-4810 4813-4829 4832-4846
4849-4865 4868-4892 4895-4908 4910-4923 4925-4938 4940-4965 4967-4999 5001-5051
5054-5199 5204 5226 5251 5253 5268 5275 5277 5291 5301-5302 5305 5326-5327 5350
5361 5369-5373 5382 5396-5397 5411 5422 5430 5438 5440 5445 5453 5456-5457 5472
-5474 5476-5477 5508 5513-5516 5518 5522-5523 5532 5575 5578 5582 5599 5605 5702
5753-5799 5806 5817 5839 5855 5860-5862 5869-5877 5879-5890 5893-5899 5901 5916
-6001 6010-6011 6013 6015 6017-6018 6027-6028 6037 6047-6050 6063 6070-6076 6081
-6082 6093-6094 6100 6103 6107-6119 6122 6124 6130-6149 6151-6167 6169-6199 6202
-6208 6210 6212-6218 6220 6222-6228 6230 6232-6238 6240 6242-6248 6250 6252-6258
6260 6262-6268 6270 6272-6373 6375-6380 6382-6387 6389-6399 6407 6413-6414 6416
6420-6422 6424-6429 6431 6433 6439-6443 6454-6458 6470-6471 6473-6475 6478 6495
6497 6499 6501-6503 6525 6600 6603 6609 6628 6637-6638 6642 6648 6650-6654 6657
-6664 6666-6671 6674-6675 6680-6682 6686-6690 6693-6696 6699-6700 6702-6703 6715
-6717 6719-6721 6723-6731 6733-6748 6752-6756 6765 6778-6779 6782 6785 6787 6791
-6801 6829-6830 6832-6837 6839 6845 6848 6853-6855 6861 6934-6936 6938 6947-6949
6953-6954 6956-6962 6970-6977 6981-6983 6985-7004 7059-7104 7107-7129 7135-7139
7142 7144-7149 7151-7154 7157 7163 7169-7170 7182-7224 7226 7228-7229 7231-7233
7235-7236 7239-7241 7243-7244 7247 7249-7250 7252-7253 7255 7257-7258 7260 7262
-7264 7266-7267 7270-7273 7277-7299 7301-7308 7310-7316 7318-7327 7329-7613 7616
-7618 7621-7623 7627 7630-7632 7636 7639 7643 7646 7650-7651 7654 7656-7657 7659
-7660 7666 7672 7678-7680 7684 7687-7689 7695-7697 7701 7704-7735 7739-7740 7744
-7750 7754-7763 7767-7776 7778-7787 7791-7792 7796-7797 7801-7804 7808-7811 7815
-7817 7821-7822 7826-7827 7833-7835 7839-7841 7845-7850 7854-7858 7862 7864-7866
7870 7872-7876 7880 7884 7890-7891 7897 7903-7904 7908 7912 7919-7920 7927 7933
-7934 7938 7944-7945 7949-7951 7958-7960 7964-7967 7971-7973 7977-7979 7983-7984
7988-7989 7995-7997 8003-8005 8009-8012 8017-8020 8024-8027 8030-8032 8035-8037
8040-8041 8044-8045 8048 8051-8052 8055-8057 8060-8062
  
```

 THERE ARE 4247 RECORDS IN THE FILE. THE NODES CHECKED ARE GIVEN BY-
 1 -8192
 THERE ARE 3715 UNUSED NODES IN THE RANGE CHECKED.
 THERE ARE 4477 NODES USED FOR THIS MODE IN THE RANGES CHECKED

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CTPS.QNET80.SUMMARY.MODE3.LISTED.RENOD80

CTPS

TABLE

C-2-3

ctps.qnet80.summary.mode4.listed.renod80

2200 2202-2212 2214-2216 2226-2231 2237-2239 2241 2245 2247-2253 2263-2282 2286
-2287 2300-2310 2319-2327 2335-2338 2340-2347 2355-2358 2363-2364

THERE ARE 98 RECORDS IN THE FILE. THE NODES CHECKED ARE GIVEN BY-

1 -8192

THERE ARE 8099 UNUSED NODES IN THE RANGE CHECKED.

THERE ARE 93 NODES USED FOR THIS MODE IN THE RANGES CHECKED

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CTPS.QNET80.SUMMARY.MODE4.LISTED.RENOD80

CTPS

TABLE
C-2-4

ctps.qnet80.summary.mode5.listed.renod80

1800-1807 1809-1811 1820-1830 1835-1839 1845-1871 1875-1883 1890-1895 1905-1910
1920-1934 1944-1953

THERE ARE 95 RECORDS IN THE FILE. THE NODES CHECKED ARE GIVEN BY-

1 -8192

THERE ARE 8092 UNUSED NODES IN THE RANGE CHECKED.

THERE ARE 100 NODES USED FOR THIS MODE IN THE RANGES CHECKED

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CTPS.QNET80.SUMMARY.MODE5.LISTED.RENOD80

CTPS

TABLE
C-2-5

 ctps.qnet80.summary.mode6.listed.renod80

1805 1807 1851 1855 1862 1924 1945-1947 2210-2212 2243 2245 2248 2252 2273 2307
 2310 2338-2339 2363-2364 2400 2404-2405 2407 2409 2412 2419 2423 2425 2428-2429
 2431 2447-2457 2465 2470 2488 2498 2508 2514-2515 2522 2568 2573 2591 2604-2607
 2643 2657-2658 2660-2662 2669-2675 2677-2678 2686 2696-2697 5209-5210 5332 5342
 -5343 5349-5350 5354 5381 5384 5388-5389 5393 5395 5398 5458 5488 5496 5507 5528
 5601 5608-5609 5659-5660 5696 5714 5739-5740 5743-5744 5868 5878 5892 6029 6088
 6200-6201 6231 6401 6415 6417 6424-6438 6448-6449 6451 6459-6468 6477 6479 6482
 -6490 6492-6499 6505-6524 6526-6606 6609-6610 6615-6622 6624-6627 6630 6655-6656
 6678-6679 6685 6700 6749-6750 6757-6764 6766-6777 6782 6805-6826 6840-6841 6843
 -6847 6865-6928 7005-7058 7130 7140-7141 7150 7155

THERE ARE 507 RECORDS IN THE FILE. THE NODES CHECKED ARE GIVEN BY-

1 -8192

THERE ARE 7727 UNUSED NODES IN THE RANGE CHECKED.

THERE ARE 465 NODES USED FOR THIS MODE IN THE RANGES CHECKED

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CTPS.QNET80.SUMMARY.MODE6.LISTED.RENOD80

CTPS

TABLE
 C-2-6

 ctps.qnet80.summary.mode7.listed.renod80

1800	1802	1804	1806-1807	1809-1811	1821	1824-1830	1836-1839	1846	1848-1850	1852			
-1853	1855	1858	1862-1870	1875	1881-1883	1890-1895	1905	1908	1910	1920-1922	1924		
1929	1931	1945	1947-1948	1950-1951	1953	2202	2204	2229-2231	2237	2239	2241	2252	
2263	2269	2275	2287	2302-2304	2307-2310	2323	2326	2327	2335-2337	2341-2342	2403		
-2406	2408	2411	2423	2426-2430	2433-2436	2439	2445	2458-2459	2461	2463-2464	2466		
2470	2472-2474	2476	2477	2479-2480	2485-2487	2490	2492-2497	2500	2503-2504	2506			
2509-2510	2516-2517	2519-2520	2523-2546	2548-2552	2554-2565	2567	2569-2572	2574					
2585-2586	2588-2590	2592-2603	2607-2611	2613-2622	2624	2626-2655	2659	2666	2668				
2690-2692	2698-2699	5200-5203	5205-5218	5220-5225	5227-5250	5252	5254-5267	5269					
-5274	5276	5278-5290	5293-5300	5303-5304	5306-5322	5324-5325	5328-5341	5343-5349					
5351-5360	5362-5368	5374-5375	5377-5381	5383-5392	5394-5395	5398-5406	5408-5410						
5412-5421	5423-5429	5431-5437	5439	5441-5444	5446-5452	5454-5455	5458-5471	5475					
5478-5494	5497-5507	5511-5512	5517	5519-5520	5524-5531	5533-5574	5576-5577	5579					
-5581	5583-5598	5600-5604	5606-5695	5697-5701	5703-5739	5741-5752	5800-5805	5807					
-5816	5818-5825	5827-5838	5840-5859	5863-5868	5878	5891-5892	5902-5903	5906-5915					
6002-6009	6011-6012	6014	6016	6019-6026	6029-6036	6038-6046	6051-6062	6064-6069					
6077-6080	6083-6092	6095-6099	6101-6102	6104-6106	6120-6121	6123	6125-6129	6150					
6168	6209	6221	6229	6409	6420-6422	6445	6611	6628	6803-6804	6838	6967	7131	7156
7158-7161	7180	7658											

 THERE ARE 1140 RECORDS IN THE FILE. THE NODES CHECKED ARE GIVEN BY-
 1 -8192
 THERE ARE 7252 UNUSED NODES IN THE RANGE CHECKED.
 THERE ARE 940 NODES USED FOR THIS MODE IN THE RANGES CHECKED

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CTPS.QNET80.SUMMARY.MODE7.LISTED.RENOD80

CTPS

TABLE
 C-2-7

ctps.qnet80.summary.mode8.listed.renod80

1821 1830 1836 1847 1865 1883 1934 2243 2247 2252 2274 2355 2377 2408 2410 2413
2415-2424 2431-2432 2437-2438 2440-2444 2446 2454 2460 2462 2467-2468 2471 2478
2481 2483-2484 2486 2489 2499-2502 2511-2513 2518 2553 2560 2573 2575 2577-2584
2587 2612 2625 2660 2664-2665 2667 2676 2679-2685 2687-2689 2693-2695 2697 2773
5209 5321 5323-5324 5332 5354-5355 5376-5377 5381 5389 5398 5528 5534 5558 5560
-5561 5563 5568-5570 5597 5739-5740 5743-5744 5805 5819 5824 5826 5828 5830-5831
5855 5857 6056 6066 6126 6211 6219 6249 6400-6406 6408 6410-6412 6415-6419 6422
6424 6433 6439-6442 6444-6447 6450 6452 6454-6459 6469-6476 6480-6481 6497-6498
6500-6504 6600 6607-6609 6612-6614 6619 6627 6629 6631-6649 6676-6677 6700-6714
6717-6718 6731-6733 6750-6751 6778-6786 6803 6805 6827-6828 6831 6838 6841-6846
6848-6852 6857 6859-6860 6862-6864 6923 6930-6945 6950-6952 6955 6964-6967 6984
7055 7057 7105-7106 7132-7133 7162 7164-7168 7171-7179 7181 7777 8191

THERE ARE 353 RECORDS IN THE FILE. THE NODES CHECKED ARE GIVEN BY-
1 -8192
THERE ARE 7873 UNUSED NODES IN THE RANGE CHECKED.
THERE ARE 319 NODES USED FOR THIS MODE IN THE RANGES CHECKED

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CTPS.QNET80.SUMMARY.MODE8.LISTED.RENOD80

CTPS
TABLE
C-2-8

data for the walk link cards. This information is presented as follows:

<u>Columns</u>	<u>Data</u>
65 - 68	Distance from centroid to station, in feet (estimate)
70 - 72	Market area distance to station, in feet (estimate)
73 - 75	Town code number
76 - 78	Walk time from centroid to station, tenth of minutes (estimate)
79 - 80	Percent of market area people and jobs within a one-third-mile radius of the station, integer 0 for none to 00 for 100 percent (estimate)

The estimates are exactly that--educated, "eye-balled" estimates based upon personal knowledge, experience and, in some cases, visits to the areas involved. Furthermore, these data have only been used in a few instances and may have been under- or over-estimated. Use these data with extreme caution until they are proven to be reliable. It is felt that the distances presented are fairly reliable, except for transcription errors; however, the percentage calculations are not as reliable and represent only an educated guess. They should be used accordingly.

C.3.2 CTPS.QNET80.MODEN.LISTED.LINES

A brief description and summary of the lines used in QNET80 are presented in Tables C-3-1 through C-3-6. The format is as follows:

<u>Column</u>	<u>Description of Item in the Column</u>
1	Mode
2-4	Line Number
5	Space
6	Oneway=1, Twoway=2
7	Space
8-30	ANODE/Station Name and/or Stop
31-52	BNODE/Station Name and/or Stop
53-56	ANODE/Station Number

<u>Column</u>	<u>Description of Item in the Column</u>
57	Space
58-61	BNODE/Station Number
62	Space
63-80	If MODE 4: Railroad Line Name If MODE 5: MBTA Line Name If MODE 6: Private Carrier Name If MODE 7: MBTA Route Number If MODE 8: MBTA Express Bus Route Number or Express Bus Carrier Name

There are MODE 4 - MODE 8 lines listed in the tables which have been sorted on line number (columns 2-4). An additional set of MODE 7 lines have been sorted on MBTA route number for cross-reference purposes (columns 63-80). Braintree extension bus routes have been arbitrarily assigned the numbers 992-999 for convenience. The station names are given by the MBTA schedule maps. Special notes are assigned wherever space permitted.

MODE 8 lines represent express bus routes; both MBTA and private-carrier routes are listed.. An express bus is one which, though it may operate as a local bus in the outlying areas, proceeds with no scheduled stops until reaching or nearing the CBD.

CTPS.QNET80.TABLE.SUMMARY.MODE4

4	1	1	BOSTON	ROCKPORT	2200	2212	BOSTON & MAINE RR
4	2	1	ROCKPORT	BOSTON	2212	2200	BOSTON & MAINE RR
4	3	1	BOSTON	IPSWICH	2200	2216	BOSTON & MAINE RR
4	4	1	IPSWICH	BOSTON	2216	2200	BOSTON & MAINE RR
4	5	2	BOSTON	READING	2200	2231	BOSTON & MAINE RR
4	6	1	BOSTON	LOWELL AM PEAK	2200	2250	BOSTON & MAINE RR
4	7	1	BOSTON	WOBURN EXPRESS	2200	2252	BOSTON & MAINE RR
4	8	1	BOSTON	LOWELL	2200	2250	BOSTON & MAINE RR
4	9	1	BOSTON	WOBURN	2200	2250	BOSTON & MAINE RR
4	10	1	LOWELL	BOSTON	2250	2200	BOSTON & MAINE RR
4	11	1	WOBURN	BOSTON	2252	2200	BOSTON & MAINE RR
4	12	1	BOSTON	WOBURN OFF PEAK SER	2200	2252	BOSTON & MAINE RR
4	13	1	WEST MEDFORD	BOSTON	2237	2200	BOSTON & MAINE RR
4	14	2	BOSTON	BEDFORD	2200	2271	BOSTON & MAINE RR
4	15	2	WINCHESTER	BOSTON	2200	2239	BOSTON & MAINE RR
4	16	2	BOSTON	BEAVERBROOK & CLEMENT	2200	2287	BOSTON & MAINE RR
4	17	2	BOSTON	HAVERHILL	2200	2248	BOSTON & MAINE RR
4	18	2	BOSTON	SOUTH ACTON OFF PEAK	2200	2282	BOSTON & MAINE RR
4	19	2	BOSTON	SOUTH ACTON PEAK	2200	2282	BOSTON & MAINE RR
4	20	2	SOUTH ACTON OFF PEAK	BOSTON	2282	2200	BOSTON & MAINE RR
4	21	1	SOUTH ACTON PEAK	BOSTON	2282	2200	BOSTON & MAINE RR
4	30	1	BOSTON	FRAMINGHAM	2300	2310	PENN CENTRAL RR
4	31	1	BOSTON	FRAMINGHAM	2300	2310	PENN CENTRAL RR
4	32	1	FRAMINGHAM	BOSTON	2310	2300	PENN CENTRAL RR
4	33	1	PROVIDENCE	BOSTON	2358	2300	PENN CENTRAL RR
4	34	1	CANTON JUNCTION	BOSTON	2356	2300	PENN CENTRAL RR
4	35	1	READVILLE	BOSTON	2337	2300	PENN CENTRAL RR
4	36	1	BOSTON	PROVIDENCE	2300	2356	PENN CENTRAL RR
4	37	1	BOSTON	CANTON JUNCTION	2300	2358	PENN CENTRAL RR
4	38	1	BOSTON	READVILLE	2300	2337	PENN CENTRAL RR
4	39	1	NEEDHAM	BOSTON	2327	2300	PENN CENTRAL RR
4	40	1	BOSTON	NEEDHAM	2300	2327	PENN CENTRAL RR
4	41	1	FRANKLIN	BOSTON	2347	2300	PENN CENTRAL RR
4	42	2	NORWOOD PEAK SER	BOSTON	2342	2300	PENN CENTRAL RR
4	43	1	BOSTON	FRANKLIN	2300	2347	PENN CENTRAL RR
4	44	1	STOUGHTON	BOSTON	2364	2300	PENN CENTRAL RR
4	45	1	BOSTON	STOUGHTON	2300	2364	PENN CENTRAL RR

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CTPS.QNET80.TABLE.SUMMARY.MODE4

CTPS

TABLE
C-3-1

CTPS.QNET80.TABLE.SUMMARY.MODE5

5	1	2	BOWDOIN	WONDERLAND	1800	1811	BLUE LINE
5	2	2	OAK GROVE	FOREST HILLS	1839	1830	ORANGE LINE
5	3	2	HARVARD SQUARE	ASHMONT	1863	1855	RED LINE ASHMONT
5	4	2	NORTH STATION	RIVERSIDE	1877	1934	GREEN L RIVERSIDE
5	5	2	PARK STREET STATION	ARBORWAY	1880	1953	GREEN L ARBORWAY
5	6	2	LECHMERE	CLEVELAND CIRCLE	1875	1910	GREEN L CLEVELAND
5	7	2	LECHMERE	BOSTON COLLEGE	1875	1895	GREEN L BC & LECH
5	8	2	MATTAPAN	ASHMONT(TROLLEY STOP)	1862	1871	RED LINE ASH-MATT
5	10	2	BRAINTREE	HARVARD SQUARE	1870	1863	RED L EXT SO BRA

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CTPS.QNET80.TABLE.SUMMARY.MODE5

CTPS

TABLE

C-3-2

CTPS.QNET80.TABLE.SUMMARY.MODE6*****START

6 1 1	MILFORD	FRAMINGHAM	6424	6428	BIG W TRANS
6 2 1	FRAMINGHAM	MILFORD	6428	6424	BIG W TRANS
6 3 2	MATTAPAN	STOUGHTON	1862	2364	BRUSH-HILL TRANS
6 4 1	MATTAPAN	PARKWAY WEST LOOP	1862	2686	BRUSH-HILL TRANS
6 5 2	MATTAPAN	CANTON	1862	2687	CANTON-BLUE HILLS
6 6 2	WAVERLY	WALTHAM VIA TRAPELLO	6088	2273	METROPOLITAN CHCH
6 7 1	ORIENT HEIGHTS	POINT SHIRLEY HIGHLDS	1807	6482	RAPID TRANSIT INC
6 8 1	POINT SHIRLEY	ORIENT HTS-HIGHLANDS	6482	1807	RAPID TRANSIT INC
6 9 1	POINT SHIRLEY	ORIENT HTS-CENTER	6482	1807	RAPID TRANSIT INC
6 10 1	ORIENT HEIGHTS	POINT SHIRLEY-CENTER	1807	6482	RAPID TRANSIT INC
6 11 1	WINTHROP HIGHLANDS	SHIRLEY POINT	5714	6482	RAPID TRANSIT INC
6 12 1	SHIRLEY POINT	WINTHROP HIGHLANDS	6482	5714	RAPID TRANSIT INC
6 13 1	ASHMONT	WHITMAN	1855	6494	HUDSON BUS LINES
6 14 1	WHITMAN	ASHMONT	6494	1855	HUDSON BUS LINES
6 15 1	ROCKLAND	ASHMONT	6603	1855	HUDSON BUS LINES
6 16 1	ASHMONT	ROCKLAND	1855	6603	HUDSON BUS LINES
6 17 1	SO WEY COL SQ	ASHMONT	6609	1855	HUDSON BUS LINES
6 18 1	ASHMONT	COL SQ SO WEYMOUTH	1855	6609	HUDSON BUS LINES
6 19 1	SO WEY COL SQ	ASHMONT	6609	1855	HUDSON BUS LINES
6 20 1	ASHMONT	COL SQ SO WEYMOUTH	1855	6609	HUDSON BUS LINES
6 21 1	HINGHAM	ASHMONT	5342	1855	HUDSON BUS LINES
6 22 1	ASHMONT	HINGHAM	1855	5342	HUDSON BUS LINES
6 23 1	EAST WEYMOUTH	ASHMONT	5350	1855	HUDSON BUS LINES
6 24 1	ASHMONT	EAST WEYMOUTH	1855	5350	HUDSON BUS LINES
6 25 2	STONEHAM	MEDFORD SQUARE	6759	5744	HUDSON BUS LINES
6 26 2	MEDFORD SQ	UPPER HIGHLANDS	5744	2607	HUDSON BUS LINES
6 27 2	MANOR	SPRING STREET DEDHAM	6705	4587	HUDSON BUS LINES
6 28 2	ENDICOTT	GROVE & WASHINGTON	2339	6777	HUDSON BUS LINES
6 29 2	ENDICOTT	SPRING STREET	2339	5458	HUDSON BUS LINES
6 30 1	ACTION ROUTE NO 1		6826	6806	ACTION, INC.
6 31 1	ACTION ROUTE NO 2		6806	6826	ACTION, INC.
6 32 2	ACTION ROUTE NO 3A		6826	6823	ACTION, INC.
6 33 1	ACTION ROUTE NO 3B		6806	6826	ACTION, INC.
6 34 2	ACTION ROUTE NO 4A		6806	6821	ACTION, INC.
6 35 1	ACTION ROUTE NO 4B		6826	6806	ACTION, INC.
6 36 1	LOWELL	LAWRENCE	6433	6845	TROMBLEY MOTOR
6 37 1	LAWRENCE	LOWELL	6845	6433	TROMBLEY MOTOR
6 38 1	PLEASANT VALLEY	TOWN FARM	6874	6881	TROMBLEY MOTOR
6 39 1	PLEASANT VALLEY	TOWN FARM	6881	6874	TROMBLEY MOTOR
6 40 1	BEACON STREET	LAWRENCE STREET	6883	6888	TROMBLEY MOTOR
6 41 1	BEACON STREET	LAWRENCE STREET	6883	6888	TROMBLEY MOTOR
6 42 1	TOWER HILL	BELT CENTRAL	6845	6897	TROMBLEY MOTOR
6 43 1	TOWER HILL	BELT CENTRAL	6897	6845	TROMBLEY MOTOR
6 44 1	WATER STREET	PROSPECT HILL	7140	6864	TROMBLEY MOTOR
6 45 1	WATER STREET	PROSPECT HILL	6894	7140	TROMBLEY MOTOR

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CTPS.QNET80.TABLE.SUMMARY.MODE6

CTPS

TABLE
C-3-3a

6 46 2 LAWRENCE ANDOVER	NORTH ANDOVER	6899 6873 TROMBLEY MOTOR
6 47 2 LAWRENCE ANDOVER	NORTH ANDOVER	6899 6845 TROMBLEY MOTOR
6 48 2 RED		6900 6916 BOSTON COMMUTER
6 49 1 BLUE		6900 6922 BOSTON COMMUTER
6 50 1 GREEN		6900 6922 BOSTON COMMUTER
6 51 1 GREEN		6922 6900 BOSTON COMMUTER
6 53 1 YELLOW		6900 6926 BOSTON COMMUTER
6 53 1 YELLOW		6926 6900 BOSTON COMMUTER
6 54 1 ORANGE		6900 6914 BOSTON COMMUTER
6 55 1 ORANGE		6900 6914 BOSTON COMMUTER
6 56 1 LOWELL	BILLERICA	6433 6437 VCELL BUS CO
6 57 1 BILLERICA	LOWELL	6437 6433 VCELL BUS CO
6 58 1 BOSTON	FRAMINGHAM	5332 2310 WELLESLEY FELS
6 59 1 FRAMINGHAM	BOSTONS	2310 5332 WELLESLEY FELS
6 60 2 BAT ROUTE NO. 1		6505 2657 BROCKTON AREA TR
6 61 2 BAT ROUTE NO. 2		6505 6511 BROCKTON AREA TR
6 62 2 BAT ROUTE NO. 2A		6505 6511 BROCKTON AREA TR
6 63 2 BAT ROUTE NO. 3		6505 6517 BROCKTON AREA TR
6 64 1 BAT ROUTE NO. 4 OUT		6505 6521 BROCKTON AREA TR
6 65 1 BAT ROUTE NO. 4 IN		6521 6505 BROCKTON AREA TR
6 66 2 BAT ROUTE NO. 4A		6505 6521 BROCKTON AREA TR
6 67 2 BAT ROUTE NO. 5		6505 2674 BROCKTON AREA TR
6 68 2 BAT ROUTE NO. 6		6505 6529 BROCKTON AREA TR
6 69 2 BAT ROUTE NO. 7		6605 5395 BROCKTON AREA TR
6 70 2 BAT ROUTE NO. 8		6605 6535 BROCKTON AREA TR
6 71 2 BAT ROUTE NO. 9		6605 6540 BROCKTON AREA TR
6 72 2 BAT ROUTE NO. 10		6506 6542 BROCKTON AREA TR
6 73 2 BAT ROUTE NO. 11		6505 6532 BROCKTON AREA TR
6 74 2 BROCKTON	ASHMONT	6505 1855 BROCKTON AREA TR
6 76 2 LRT ROUTE NO. 703		6571 2450 LOWELL REG TRANS
6 77 2 LRT ROUTE NO. 704		6546 6552 LOWELL REG TRANS
6 78 2 LRT ROUTE NO. 705		6546 6560 LOWELL REG TRANS
6 79 1 LRT ROUTE NO. 706	AM OUT	6546 2696 LOWELL REG TRANS
6 80 1 LRT ROUTE NO. 706	AM IN	2696 6546 LOWELL REG TRANS
6 81 1 LRT ROUTE NO. 706	PM OUT	6546 2696 LOWELL REG TRANS
6 82 1 LRT ROUTE NO. 706	PM IN	2696 6546 LOWELL REG TRANS
6 83 1 LRT ROUTE NO. 707	PM OUT	6546 6548 LOWELL REG TRANS
6 84 1 LRT ROUTE NO. 707	PM IN	6568 6546 LOWELL REG TRANS
6 85 2 LRT ROUTE NO. 709		6571 6570 LOWELL REG TRANS
6 86 2 LRT ROUTE NO. 710		6571 6570 LOWELL REG TRANS
6 87 2 LRT ROUTE NO. 711		6571 6579 LOWELL REG TRANS
6 88 1 LRT ROUTE NO. 712	OUT	6571 6785 LOWELL REG TRANS
6 89 1 LRT ROUTE NO. 712	IN	6585 65(1 LOWELL REG TRANS
6 90 2 LRT ROUTE NO. 720		6571 6575 LOWELL REG TRANS
6 91 1 LRT ROUTE NO. 721	OUT	6571 6591 LOWELL REG TRANS
6 92 1 LRT ROUTE NO. 721	IN	6591 6571 LOWELL REG TRANS
6 93 2 BROCKTON	STOUGHTON	6505 6592 INTERSTATE TRANS
6 94 1 BROCKTON	EASTON	6505 7046 INTERSTATE TRANS
6 95 1 EASTON	BROCKTON	7046 6505 INTERSTATE TRANS
6 96 2 BROCKTON	HANOVER MALL	6505 7007 CROCKER TRANS

6 97 2 BROCKTON	WHITMAN/ABINGTON	6505 6603	CROCKER TRANS
6 98 2 LOWELL	TEWKSBURY STATE HOSP	6571 7018	BLANCHARD BUS LNS
6 99 1 LOWELL	TEWKSBURY MAIN ST	6571 7019	BLANCHARD BUS LNS
6100 1 TEWKSBURY	LOWELL MAIN ST	7019 6571	BLANCHARD BUS LNS
6101 1 LOWELL	TEWKSBURY WHIPPLE RD	6571 7019	BLANCHARD BUS LNS
6102 2 LOWELL	CHELMSFORD CENTER	6571 7032	MARINEL TRANSPORT
6103 2 LOWELL	NO CHELMSFORD	6571 7034	MARINEL TRANSPORT
6104 2 LOWELL	DRACUT	6571 7039	PIERCE
6105 2 LAKE SHORE PARK	NO SHORE SHOPPING CTR	2470 7057	MICHAUD BUS LINES
6106 2 LAKE SHORE PARK	SALEM CENTER	7057 7055	MICHAUD BUS LINES
6107 2 COLUMBIA STATION	U OF MASS	7150 6077	HUDSON BUS LINES
6108 2 AIRPORT STATION	LOGAN AIRPORT LOOP	1805 6805	MASSPORT
6109 2 HULL	HINGHAM	5342 5495	HUDSON BUS LINES
6110 2 FRAMINGHAM	TEMPLE ST	2310 6782	WELLESLEY FELLOWS
6111 1 FRAMINGHAM	SAXONVILLE	2310 6451	WELLESLEY FELLOWS
6112 2 SAXONVILLE	FRAMINGHAM	6451 2310	WELLESLEY FELLOWS
6113 1 SAXONVILLE	FRAMINGHAM	6451 2310	WELLESLEY FELLOWS
6114 1 FRAMINGHAM	MANSION INN	2310 6656	WELLESLEY FELLOWS
6115 1 MANSION	FRAMINGHAM	6656 2310	WELLESLEY FELLOWS
6116 2 FRAMINGHAM	NOBSCOT	2310 6685	WELLESLEY FELLOWS

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7 1 1	QUEENSBURY	BOYL & FAIRFIELD	5671	5202	55
7 2 1	BOYL & FAIRFIELD	QUEENSBURY	5202	5671	55
7 3 1	COPLEY	E CONCORD ST	1883	5307	68
7 4 1	E CONCORD ST	COPLEY	5307	1883	68
7 5 1	NORTHAMPTON	KNEELAND ST	1826	1824	49-3
7 6 1	KNEELAND ST	NORTHAMPTON	1824	1826	49-3
7 7 1	EGLESTON	STUART ST	1828	1846	43-1
7 8 1	STUART ST	EGLESTON	1846	1828	43-1
7 9 1	SOUTH STATION	NORTH STATION	1848	5338	02
7 10 1	NORTH STATION	SOUTH STATION	5338	1848	02
7 11 2	HARVARD	DUDLEY	1863	1827	01
7 12 1	CITY PT	COPLEY	5645	1883	09
7 13 1	COPLEY	CITY PT	1883	5645	09
7 14 1	CITY PT	KNEELAND	5644	5322	11
7 15 1	KNEELAND	CITY PT	5322	5644	11
7 16 1	ARMY BASE	HAYMARKET	5866	1821	06
7 17 1	HAYMARKET	ARMY BASE	1821	5866	06
7 18 2	CITY POINT	SOUTH STATION	1848	5645	07
7 19 2	COLUMBIA POINT	DUDLEY	6077	1827	08
7 20 2	CITY PT	DUDLEY	5645	1827	10
7 21 1	CENTRAL SQ	CITY HOSP	1864	5307	47
7 22 1	CITY HOSP	CENTRAL SQ	5307	1864	47
7 23 2	WOOD ISLE PARK	MAVERICK	1804	1806	121
7 24 2	ORIENT HEIGHTS	MAVERICK	5214	5224	120
7 25 2	WONDLND	MAVERICK VIA BEACH	6079	1811	117
7 26 2	WONDERLAND	MAVERICK VIA REVERE	1804	1811	116
7 27 2	EVERETT SQ	MAVERICK	1804	1838	112
7 28 1	BEACHMONT	CITY HALL REVERE	2590	5725	119
7 29 1	CITY HALL REVERE	BEACHMONT	5725	2590	119
7 30 2	WONDERLAND	WELLINGTON	1811	1837	110
7 31 2	CNTL SQ	WINTHROP HGL	5714	2202	410
7 32 2	LINDEN	REVERE BEACH	2487	1811	411
7 33 1	HAYMARKET	WOODLAND	1821	5295	111
7 34 1	WOODLAWN	HAYMARKET	5295	1821	111
7 35 2	MALDEN SQ	SULLIVAN	1836	1838	104
7 36 2	MALDEN VIA FAULKNER	SULLIVAN	1836	1838	105
7 37 2	LINDEN VIA BROADWAY	SULLIVAN	1836	2487	109
7 38 2	WELLINGTON	UPPER HIGHLD	1837	2607	99-7
7 39 2	WELLINGTON	LEBANON MALD	1837	5531	106-1,2
7 40 1	WELLINGTON	LINDEN SQ	1837	2487	108
7 41 1	LINDEN SQ	WELLINGTON	2487	1837	108
7 42 2	BROADWAY NORTH	MALDEN STATION	2603	1838	107
7 43 2	MALDEN	WELLINGTON	1838	1836	97-4
7 44 2	ELM ST	WELLINGTON	1837	5740	100
7 45 2	SAUGUS	MALDEN SQ	1838	6007	430

7 46 2	CENTRAL SQUARE LYNN	OAKLAND	5540	2202	428
7 47 2	CENTRAL SQUARE LYNN	BREED SQ	2202	5569	431
7 48 2	CENTRAL SQUARE LYNN	PINE HILL	5551	2202	433
7 49 2	CENTRAL SQUARE LYNN	FAYES AVE	6065	2202	456
7 50 2	CENTRAL SQUARE LYNN	LAKESIDE	5554	2202	437
7 51 2	CLEVELAND CIRCLE	ARBORWAY	5686	1953	51
7 52 2	ASHMONT	FOREST HILLS	1830	1855	21
7 53 2	CLEARY SQ	ARBORWAY	2336	1953	32
7 54 2	MATTAPAN SQ	ROSLINDALE SQUARE	5415	1862	30
7 55 2	GEORGETOWNE	ARBORWAY	7158	1953	40
7 56 2	SEAVER ST LOOP	DUDLEY	1827	5612	44
7 57 2	FRANKLIN PARK	DUDLEY	1827	5439	45-1
7 58 2	FRANKLIN PARK	ANDREW	1828	1850	16
7 59 2	EGLESTON	DUDLEY	1827	1828	42
7 60 2	KANE SQ	DUDLEY	1827	5631	15
7 61 2	MATTAPAN	EGLESTON	1828	1862	29
7 62 2	MATTAPAN	ARBORWAY	1953	1862	28
7 63 2	WOLCOTT SQ	MATTAPAN	2377	1862	31
7 64 2	HEATH & SOUTH HUNT	DUDLEY	1827	5661	46
7 65 2	CENTER & ELLIOTT	DUDLEY	1827	5615	41
7 66 2	ALLSTON	DUDLEY	1827	5679	66
7 67 2	FIELDS CORNER	DUDLEY	1827	1853	19
7 68 2	ASHMONT	DUDLEY VIA WASHINGTON	1827	1855	23
7 69 2	ASHMONT	DUDLEY VIA TALBOT	1827	1855	22
7 70 2	ASHMONT	ANDREW	1850	1855	18
7 71 2	FIELD CORNER	ANDREW	1850	1853	17
7 72 2	GALLIVAN BLVD	ASHMONT	1855	5425	25
7 73 2	MATTAPAN	ASHMONT	1855	1862	27
7 74 1	NORFOLK ST	ASHMONT STA	5425	1855	26
7 76 1	STATE HOSPITAL	DUDLEY STA	5427	1827	48-1
7 77 2	MATTAPAN	DEDHAM LINE	1862	6043	33-6
7 78 1	WAKEFIELD	MATTAPAN	5405	1862	24
7 79 1	CLEARY SQUARE	ARBORWAY	2336	1953	50
7 80 1	ARLINGTON	LECHMERE	5466	1829	38
7 81 1	CHESTNUT HILL	FOREST HILL	5496	1830	59-4
7 82 2	CHESTNUT HILL	KENMORE STATION	5496	1921	60
7 83 1	SAVIN HILL	NORTHAMPTON	1852	1826	13-1
7 84 2	DEDHAM LINE	ARBORWAY	5401	1953	34
7 85 2	STIMSON & WASHINGTON	ARBORWAY	5461	1953	35
7 86 2	CHARLES RIVER PLAZA	ARBORWAY	5458	1953	36
7 87 1	BAKER VIA VERMONT	ARBORWAY	5480	1953	37
7 88 2	WATERTOWN	KENMORE	5831	1921	57
7 89 2	QUINCY CTR	NO QUINCY BILLINGS RD	1866	1868	212-2
7 90 2	QUINCY CTR	GERMANTOWN	1868	5503	214-1
7 91 2	BOSTON COLLEGE	BLANDFORD ST	1895	1921	58
7 92 2	BRIGHTON CTR	KENMORE	5688	1921	65
7 93 1	GRANITE ST	CENTRAL CAMP	5242	1864	67
7 94 2	QUINCY CTR	ASHMONT-W-QUINCY	1868	1855	215-1
7 95 2	QUINCY	HOUGH NECK	1868	5502	216
7 96 2	QUINCY CTR	HINGHAM	1868	5342	220

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7 97 2	QUINCY CTR	FORT POINT	1868	5346	221
7 98 2	QUINCY CTR	EAST WEYMOUTH	1868	5350	222
7 99 1	QUINCY CTR	EAST BRAINTREE	1868	5357	228
7100 2	QUINCY CTR	NO QUINCYSTA	1866	1868	210-2
7101 2	QUINCY CTR	SQUANTUM MONTCLAIR	6105	1868	211
7102 2	ASHMONT STA	WOLLASTON BEACH	1855	5362	217-1
7103 1	ASHMONT STA	NORFOLK ST	1855	5425	26
7104 1	EAST BRAINTREE	QUINCY CTR	5357	1868	228
7105 2	ARBORWAY	EAST WALPOLE	1953	6129	34-6
7107 1	DUDLEY STATION	STATE HOSPITAL	1827	5427	48-1
7108 1	MATTAPAN	WAKEFIELD	1862	5405	24
7109 1	GREEN ST STA	WREN ST	1829	5466	38
7110 1	FOREST HILL	CHESTNUT HILL	1830	5496	59-4
7111 1	NORTHAMPTON	SAVIN HILL	1826	1852	13-1
7112 1	ARBORWAY	BAKER VIA VERMONT	1953	5480	37
7113 1	CENTRAL SQ	GRANITE ST	1864	5242	67
7114 2	QUINCY CENTER	RANDOLPH	1868	1870	230
7115 1	QUINCY CTR	HOLBROOK	1868	5395	230-3
7116 1	QUINCY CTR	WEYMOUTH DES MOINES	1868	5355	225-1
7117 1	WEYMOUTH	QUINCY DES MOINES	5355	1868	225-1
7118 1	QUINCY CTR	WEYMOUTH LANDING	1868	5354	225
7119 1	WEYMOUTH	QUINCY CTR	5892	1868	225
7120 2	QUINCY CTR	SOUTH SHORE PLAZA	1868	5359	237
7121 2	QUINCY CTR	CRAWFORD SQ	1868	1855	238
7122 2	ASHMONT	CRAWFORD SQ	1855	5505	240
7123 2	QUINCY CTR	FIELD CORNER	1855	2658	210-3
7123 2	ASHMONT	AVON CENTER	1855	2658	240-1
7124 2	QUINCY VIA E MILTON	MATTAPAN	1862	1868	245-4
7125 2	QUINCY CENTER	FIELDS CORNER	1868	1853	210-1
7126 2	CYPRESS & HIGH	KENMORE	1921	5665	60-1
7127 2	CHESTNUT HILL	KENMORE	5496	1921	60-5
7128 2	EGLESTON	ANDREW	1830	6077	16-1
7132 2	MALDEN STA	SULLIVAN STA	1838	1836	101-3
7134 2	WOODLAND	WELLINGTON	1837	5295	110-2
7135 2	FREEMPORT & MILLS	FIELDS CORNER	1853	5448	14
7136 1	ASHMONT	E-MILTON SQ	1855	5378	246
7137 1	E-MILTON	ASHMONT	5378	1855	246
7138 2	CENTRAL SQUARE LYNN	NAHANT	2202	5915	439
7140 2	SALEM	DANVERS STATE HOSP	2204	6125	468-4
7143 1	FIELDS CORNER LOOP	VIA ADAMS OUTBOUND	1853	5443	20-1,6
7144 1	FIELDS CORNER LOOP	VIA ADAMS INBOUND	5443	1853	20-1,6
7145 1	FIELDS CORNER LOOP	VIA ADAMS & HALLET O	1853	5443	20-2
7146 1	FIELDS CORNER LOOP	VIA ADAMS & HALLET I	5443	1853	20-2
7147 1	FIELDS CORNER	NEPONSET & ADAMS	1853	5443	20-7
7148 1	NEPONSET & ADAMS	FIELDS CORNER LOOP	5443	1853	20-7
7151 2	CENTRAL SQUARE LYNN	HAPPY VALLEY	2202	5556	436
7152 2	CENTRAL SQUARE LYNN	NO SAUGUS	5539	2202	429
7153 2	CENTRAL SQUARE LYNN	HOLYOKE	5547	2202	432
7154 2	MALDEN	WOBURN	1838	2252	133
7155 2	MELROSE EAST	MALDEN	1838	5526	131

7156 1 WYOMING SQ	MELROSE EAST	5530	5529	130
7157 1 MELROSE EAST	WOYOMING SQ	5529	5530	130
7158 2 MALDEN	WAKEFIELD	1838	5524	135
7159 2 MALDEN	WILMINGTON	1838	2241	136
7160 2 MALDEN	READING LINE	1838	6014	137
7161 2 WELLINGTON	WOBURN	1837	5537	134
7162 2 WELLINGTON	WINTHROP ST	1837	5746	134-6
7163 2 SULLIVAN	SALEM ST	5743	1836	101
7164 2 SULLIVAN	W-MEDFORD	5746	1836	95
7165 2 SULLIVAN	HAYMARKET MA	1836	1821	92
7166 2 SULLIVAN	HAYMARKET VIA BUNKER	1836	1821	93
7167 2 SULLIVAN	CLAREDON HILL	2620	1836	89
7168 2 ARLINGTON CTR	LECHMERE	5855	1875	80
7169 2 DAVIS SQ	SULLIVAN HIGHLAND	5259	1836	90
7170 2 DAVIS SQ	SULLIVAN SQ	5259	1836	94
7171 2 CLAREDON HILL	LECHMERE HIGHLAND	2620	1875	88
7172 2 CLAREDON HILL	LECHMERE SOMMERVILLE	2620	1875	87
7173 2 SPRING HILL	KENDALL	5257	1865	85
7174 2 SULLIVAN	CENTRAL SQ	1864	1836	91
7175 2 CENTRAL SQCA	RINDGE AVE	1864	5262	83
7176 2 KENDALL	HARVARD BROADWAY	1863	1865	75
7177 2 HARVARD	LECHMERE	1863	1875	69
7178 1 CENTRAL SQ CAMB	OAK SQ	1864	5693	64
7179 1 OAK SQ	CENTRAL SQ	5693	1864	64
7180 1 CENTRAL SQ CAMBRIDGE	WATERTOWN	1864	5831	70
7181 1 WATERTOWNN	CENTRAL SQ CAMBRIDGE	5831	1864	70
7182 1 CENTRAL SQ CAMB	CLEVELAND CIRCLE	1864	1910	63
7183 1 CLEVELAND CIRCLE	CENTRAL SQ CAMB	1910	1864	63
7184 2 UNION SQ SOM	SOMRVL/ALLSTON	5237	5679	86
7185 2 HARVARD	WAVERLEY	2621	2773	73
7186 2 HARVARD	WATERTOWN	1863	5631	71-3
7187 2 HARVARD	HURON AVE	5250	1863	72
7188 2 HARVARD	BELMONT CENTER	1863	6054	74
7189 1 HARVARD	PARK CIRCLE	1863	5845	78
7190 1 PARK CIRCLE	HARVARD	5845	1865	78
7191 1 HARVARD	ARLMONT	1863	5846	84
7192 1 ARLMONT	HARVARD	2516	1863	84
7193 2 ARLINGTON HT	HARVARD	1863	5847	77
7194 1 HARVARD	MEDFORD SQ	1863	5744	96
7195 1 MEDFORD SQ	HARVARD	5744	1863	96
7196 2 ARLINGTON CTR	LECHMERE SOMERVILLE	5855	1875	87-2
7197 1 CENTRAL SQCA	WALTHAM WATT	1864	6002	523-3
7198 1 WALTHAM WATT	CENTRAL SQCA	6002	1864	523-3
7199 2 AUBURNDALE	NEWTON CNR	5435	2648	527-1
7200 2 ROBERTS	NEWTON CNR	2275	2648	520
7201 2 NEWTON CNR	WAVERLY	2773	2648	521
7202 2 ARLINGTON	BEDFORD HSPL	6025	5847	529
7203 2 ARLMONT	HANSCOM BASE	6023	2516	528
7204 2 FIVE FORKS	ARLINGTON CT	6022	5855	530-5
7205 1 WALTHAM	LEXINGTON	2274	2269	525-1

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7206 1 LEXINGTON	WALTHAM	2269 2274	525-1
7207 1 WALTHAM	NEWTON CNR	6006 2648	522-2
7208 1 NEWTON CNR	WALTHAM	5822 6006	522-2
7209 2 NEEDHAM	WATERTOWN	5831 2326	532
7210 1 WATERTOWN SQ	CHARLES RVR	1848 5866	533
7211 1 CHARLES RVR	WATERTOWN	5458 5831	533
7212 2 FRAMINGHAM	NEWTON CNR	2648 2310	531
7213 2 CENTRAL SQUARE LYNN	LAKSHORE PARK	2202 2470	435
7214 2 CENTRAL SQUARE LYNN	LIBERTY TREE	2202 5907	435-1
7215 2 SALEM CTR	DANVERS SQ	2204 5906	458-4
7217 2 SALEM CTR	SALEM WILLOW	2204 5587	453
7216 2 SALEM CTR	NO BEVERLY	2204 6102	451
7218 2 CENTRAL SQUARE LYNN	SALEM LORING	2204 2202	455
7219 2 SALEM CTR	MARBLEHEAD	2204 5911	454
7220 2 SALEM CTR	SALEM COLLE	2204 6059	461
7221 2 SALEM CTR	OAKLAND ST	5580 2204	457
7222 2 CENTRAL SQUARE LYNN	MARBLEHEAD PARADISE	2202 5911	441
7223 2 CENTRAL SQUARE LYNN	MARBLEHEAD HUMPHREY	2202 5911	442
7224 2 CENTRAL SQUARE LYNN	SWAMPSCOTT	2202 5573	444-2
7225 2 LINDEN SQ	WINTHROP HIG	2487 5714	412
7226 1 CLIFTONDALE	CENTRAL SQ LYNN	6066 2202	426-C
7227 1 CTRAL SQ LYNN	CLIFTONDALE	2202 6066	426-C
7228 2 BRAINTREE EXTENSION		5393 1869	999-1
7229 2 BRAINTREE EXTENSION		1870 5506	997-2
7230 1 BRAINTREE EXTENSION		5390 1868	996-3
7231 1 BRAINTREE EXTENSION		1868 5390	995-3
7232 2 BRAINTREE EXTENSION		1868 5395	994-4
7233 2 BRAINTREE EXTENSION		1870 5393	993-5
7234 2 BRAINTREE EXTENSION		5389 1868	992-6
7235 2 WAVERLEY	NEWTON CORNER WARREN	2273 5805	521-WAR
7236 1 LAKE SHORE PARK	CENTRAL SQ LYNN	2470 2202	435

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7 11 2 HARVARD	DUDLEY	1863 1827	01
7 9 1 SOUTH STATION	NORTH STATION	1848 5338	02
7 10 1 NORTH STATION	SOUTH STATION	5338 1848	02
7 16 1 ARMY BASE	HAYMARKET	5866 1821	06
7 17 1 HAYMARKET	ARMY BASE	1821 5866	06
7 18 2 CITY POINT	SOUTH STATION	1848 5645	07
7 19 2 COLUMBIA POINT	DUDLEY	6077 1827	08
7 12 1 CITY PT	COPLEY	5645 1883	09
7 13 1 COPLEY	CITY PT	1883 5645	09
7 20 2 CITY PT	DUDLEY	5645 1827	10
7 14 1 CITY PT	KNEELAND	5644 5322	11
7 15 1 KNEELAND	CITY PT	5322 5644	11
7 83 1 SAVIN HILL	NORTHAMPTON	1852 1826	13-1
7111 1 NORTHAMPTON	SAVIN HILL	1826 1852	13-1
7135 2 FREEPORT & MILLS	FIELDS CORNER	1853 5448	14
7 60 2 KANE SQ	DUDLEY	1827 5631	15
7 58 2 FRANKLIN PARK	ANDREW	1828 1850	16
7128 2 EGLESTON	ANDREW	1830 6077	16-1
7 71 2 FIELD CORNER	ANDREW	1850 1853	17
7 70 2 ASHMONT	ANDREW	1850 1855	18
7 67 2 FIELDS CORNER	DUDLEY	1827 1853	19
7143 1 FIELDS CORNER LOOP	VIA ADAMS OUTBOUND	1853 5444	20-1,6
7144 1 FIELDS CORNER LOOP	VIA ADAMS INBOUND	5443 1853	20-1,6
7145 1 FIELDS CORNER LOOP	VIA ADAMS & HALLET O	1853 5443	20-2
7146 1 FIELDS CORNER LOOP	VIA ADAMS & HALLET I	5443 1853	20-2
7147 1 FIELDS CORNER	NEPONSET & ADAMS	1853 5443	20-7
7148 1 NEPONSET & ADAMS	FIELDS CORNER LOOP	5443 1853	20-7
7 52 2 ASHMONT	FOREST HILLS	1830 1855	21
7 69 2 ASHMONT	DUDLEY VIA TALBOT	1827 1855	22
7 68 2 ASHMONT	DUDLEY VIA WASHINGTON	1827 1855	23
7 78 1 WAKEFIELD	MATTAPAN	5405 1862	24
7108 1 MATTAPAN	WAKEFIELD	1862 5405	24
7 72 2 GALLIVAN BLVD	ASHMONT	1855 5425	25
7 74 1 NORFOLK ST	ASHMONT STA	5425 1855	26
7103 1 ASHMONT STA	NORFOLK ST	1855 5425	26
7 73 2 MATTAPAN	ASHMONT	1855 1862	27
7 62 2 MATTAPAN	ARBORWAY	1953 1862	28
7 61 2 MATTAPAN	EGLESTON	1828 1862	29
7 54 2 MATTAPAN SQ	ROSLINDALE SQUARE	5415 1862	30
7 63 2 WOLCOTT SQ	MATTAPAN	2377 1862	31
7 53 2 CLEARY SQ	ARBORWAY	2336 1953	32
7 77 2 MATTAPAN	DEDHAM LINE	1862 6043	33-6
7 84 2 DEDHAM LINE	ARBORWAY	5461 1953	34
7105 2 ARBORWAY	EAST WALPOLE	1953 6129	34-6
7 85 2 STIMSON & WASHINGTON	ARBORWAY	5461 1953	35

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7 86 2	CHARLES RIVER PLAZA	ARBORWAY	5458 1953	36
7 87 1	BAKER VIA VERMONT	ARBORWAY	5480 1953	37
7112 1	ARBORWAY	BAKER VIA VERMONT	1953 5480	37
7 80 1	ARLINGTON	LECHMERE	5466 1829	38
7109 1	GREEN ST STA	WREN ST	1829 5466	38
7 55 2	GEORGETOWNE	ARBORWAY	7158 1953	40
7 65 2	CENTER & ELLIOTT	DUDLEY	1827 5615	41
7 59 2	EGLESTON	DUDLEY	1827 1828	42
7 7 1	EGLESTON	STUART ST	1828 1846	43-1
7 8 1	STUART ST	EGLESTON	1846 1828	43-1
7 56 2	SEAVER ST LOOP	DUDLEY	1827 5612	44
7 57 2	FRANKLIN PARK	DUDLEY	1827 5439	45-1
7 64 2	HEATH & SOUTH HUNT	DUDLEY	1827 5661	46
7 21 1	CENTRAL SQ	CITY HOSP	1864 5307	47
7 22 1	CITY HOSP	CENTRAL SQ	5307 1864	47
7 76 1	STATE HOSPITAL	DUDLEY STA	5427 1827	48-1
7107 1	DUDLEY STATION	STATE HOSPITAL	1827 5427	48-1
7 5 1	NORTHAMPTON	KNEELAND ST	1826 1824	49-3
7 6 1	KNEELAND ST	NORTHAMPTON	1824 1826	49-3
7 79 1	CLEARY SQUARE	ARBORWAY	2336 1953	50
7 51 2	CLEVELAND CIRCLE	ARBORWAY	5686 1953	51
7 1 1	QUEENSBURY	BOYL & FAIRFIELD	5671 5202	55
7 2 1	BOYL & FAIRFIELD	QUEENSBURY	5202 5671	55
7 88 2	WATERTOWN	KENMORE	5831 1921	57
7 91 2	BOSTON COLLEGE	BLANDFORD ST	1895 1921	58
7 81 1	CHESTNUT HILL	FOREST HILL	5496 1830	59-4
7110 1	FOREST HILL	CHESTNUT HILL	1830 5496	59-4
7 82 2	CHESTNUT HILL	KENMORE STATION	5496 1921	60
7126 2	CYPRESS & HIGH	KENMORE	1921 5665	60-1
7127 2	CHESTNUT HILL	KENMORE	5496 1921	60-5
7182 1	CENTRAL SQ CAMB	CLEVELAND CIRCLE	1864 1910	63
7183 1	CLEVELAND CIRCLE	CENTRAL SQ CAMB	1910 1864	63
7178 1	CENTRAL SQ CAMB	OAK SQ	1864 5693	64
7179 1	OAK SQ	CENTRAL SQ	5693 1864	64
7 92 2	BRIGHTON CTR	KENMORE	5688 1921	65
7 66 2	ALLSTON	DUDLEY	1827 5679	66
7 93 1	GRANITE ST	CENTRAL CAMP	5242 1864	67
7113 1	CENTRAL SQ	GRANITE ST	1864 5242	67
7 3 1	COPLEY	E CONCORD ST	1883 5307	68
7 4 1	E CONCORD ST	COPLEY	5307 1883	68
7177 2	HARVARD	LECHMERE	1863 1875	69
7180 1	CENTRAL SQ CAMBRIDGE	WATERTOWN	1864 5831	70
7181 1	WATERTOWN	CENTRAL SQ CAMBRIDGE	5831 1864	70
7186 2	HARVARD	WATERTOWN	1863 5831	71-3
7187 2	HARVARD	HURON AVE	5250 1863	72
7185 2	HARVARD	WAVERLEY	2621 2773	73
7188 2	HARVARD	BELMONT CENTER	1863 6054	74
7176 2	KENDALL	HARVARD BROADWAY	1863 1865	75
7193 2	ARLINGTON HT	HARVARD	1863 5847	77
7189 1	HARVARD	PARK CIRCLE	1863 5845	78

7190	1	PARK CIRCLE	HARVARD	5845	1863	78
7168	2	ARLINGTON CTR	LECHMERE	5855	1875	80
7175	2	CENTRAL SQCA	RINDGE AVE	1864	5262	83
7191	1	HARVARD	ARLMONT	1863	5846	84
7192	1	ARLMONT	HARVARD	2516	1863	84
7173	2	SPRING HILL	KENDALL	5257	1865	85
7184	2	UNION SQ SOM	SOMRVL/ALLSTON	5237	5679	86
7172	2	CLAREDON HILL	LECHMERE SOMMERVILLE	2620	1875	87
7196	2	ARLINGTON CTR	LECHMERE SOMERVILLE	5855	1875	87-2
7171	2	CLAREDON HILL	LECHMERE HIGHLAND	2620	1875	88
7167	2	SULLIVAN	CLAREDON HILL	2620	1836	89
7169	2	DAVIS SQ	SULLIVAN HIGHLAND	5259	1836	90
7174	2	SULLIVAN	CENTRAL SQ	1864	1836	91
7165	2	SULLIVAN	HAYMARKET MA	1836	1821	92
7166	2	SULLIVAN	HAYMARKET VIA BUNKER	1836	1821	93
7170	2	DAVIS SQ	SULLIVAN SQ	5259	1836	94
7164	2	SULLIVAN	W-MEDFORD	5746	1836	95
7194	1	HARVARD	MEDFORD SQ	1863	5744	96
7195	1	MEDFORD SQ	HARVARD	5744	1863	96
7 43	2	MALDEN	WELLINGTON	1838	1836	97-4
7 38	2	WELLINGTON	UPPER HIGHLD	1837	2607	99-7
7 44	2	ELM ST	WELLINGTON	1837	5740	100
7163	2	SULLIVAN	SALEM ST	5743	1836	101
7132	2	MALDEN STA	SULLIVAN STA	1838	1836	101-3
7 35	2	MALDEN SQ	SULLIVAN	1836	1838	104
7 36	2	MALDEN VIA FAULKNER	SULLIVAN	1836	1838	105
7 39	2	WELLINGTON	LEBANON MALD	1837	5531	106-1,2
7 42	2	BROADWAY NORTH	MALDEN STATION	2603	1838	107
7 40	1	WELLINGTON	LINDEN SQ	1837	2487	108
7 41	1	LINDEN SQ	WELLINGTON	2487	1837	108
7 37	2	LINDEN VIA BROADWAY	SULLIVAN	1836	2487	109
7 30	2	WONDERLAND	WELLINGTON	1811	1837	110
7134	2	WOODLAND	WELLINGTON	1837	5295	110-2
7 33	1	HAYMARKET	WOODLAND	1821	5295	111
7 34	1	WOODLAWN	HAYMARKET	5295	1821	111
7 27	2	EVERETT SQ	MAVERICK	1804	1838	112
7 26	2	WONDERLAND	MAVERICK VIA REVERE	1804	1811	116
7 25	2	WONDLND	MAVERICK VIA BEACH	1804	1811	117
7 28	1	BEACHMONT	CITY HALL REVERE	2590	5725	119
7 29	1	CITY HALL REVERE	BEACHMONT	5725	2590	119
7 24	2	ORIENT HEIGHTS	MAVERICK	5214	5224	120
7 23	2	WOOD ISLE PARK	MAVERICK	1804	1806	121
7156	1	WYOMING SQ	MELROSE EAST	5530	5529	130
7157	1	MELROSE EAST	WYOMING SQUARE	5529	5530	130
7155	2	MELROSE EAST	MALDEN	1838	5526	131
7154	2	MALDEN	WOBURN	1838	2252	133
7161	2	WELLINGTON	WOBURN	1837	5537	134
7162	2	WELLINGTON	WINTHROP ST	1837	5746	134-6
7158	2	MALDEN	WAKEFIELD	1838	5524	135
7159	2	MALDEN	WILMINGTON	1838	2241	136

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CTPS.QNET80.TABLE.SUMMARY.MODE7
MBTA NUMBER SORTED

CTPS

TABLE
C-3-5c

7160 2	MALDEN	READING LINE	1838	6014	137
7125 2	QUINCY CENTER	FIELDS CORNER	1853	1868	210-1
7100 2	QUINCY CTR	NO QUINCYSTA	1866	1868	210-2
7101 2	QUINCY CTR	SQUANTUM MONTCLAIR	6105	1868	211
7 89 2	QUINCY CTR	NO QUINCY BILLINGS RD	1866	1868	212-2
7 90 2	QUINCY CTR	GERMANTOWN	1868	5503	214-1
7 94 2	QUINCY CTR	ASHMONT-W-QUINCY	1868	1855	215-1
7 95 2	QUINCY	HOUGH NECK	1868	5502	216
7102 2	ASHMONT STA	WOLLASTON BEACH	1855	5362	217-1
7 96 2	QUINCY CTR	HINGHAM	1868	5342	220
7 97 2	QUINCY CTR	FORT POINT	1868	5346	221
7 98 2	QUINCY CTR	EAST WEYMOUTH	1868	5350	222
7118 1	QUINCY CTR	WEYMOUTH LANDING	1868	5354	225
7119 1	WEYMOUTH	QUINCY CTR	5892	1868	225
7116 1	QUINCY CTR	WEYMOUTH DES MOINES	1868	5355	225-1
7117 1	WEYMOUTH	QUINCY DES MOINES	5355	1868	225-1
7 99 1	QUINCY CTR	EAST BRAINTREE	1868	5357	228
7104 1	EAST BRAINTREE	QUINCY CTR	5357	1868	228
7114 2	QUINCY CENTER	RANDOLPH	1868	1870	230
7115 1	QUINCY CTR	HOLBROOK	1868	5395	230-3
7120 2	QUINCY CTR	SOUTH SHORE PLAZA	1868	5389	237
7121 2	QUINCY CTR	CRAWFORD SQ	1868	1855	238
7122 2	ASHMONT	CRAWFORD SQ	1855	5505	240
7123 2	ASHMONT	AVON CENTER	1855	2658	240-1
7124 2	QUINCY VIA E MILTON	MATTAPAN	1862	1868	245-4
7136 1	ASHMONT	E-MILTON SQ	1855	5378	246
7137 1	E-MILTON	ASHMONT	5378	1855	246
7 31 2	CNTL SQ	WINTHROP HGL	5714	2202	410
7 32 2	LINDEN	REVERE BEACH	2487	1811	411
7225 2	LINDEN SQ	WINTHROP HIG	2487	5714	412
7226 1	CLIFTONDALE	CENTRAL SQ LYNN	6066	2202	426-C
7227 1	CTRAL SQ LYNN	CLIFTONDALE	2202	6066	426-C
7 46 2	CENTRAL SQUARE LYNN	OAKLAND	5540	2202	428
7152 2	CENTRAL SQUARE LYNN	NO SAUGUS	5539	2202	429
7 45 2	SAUGUS	MALDEN SQ	1838	6007	430
7 47 2	CENTRAL SQUARE LYNN	BREED SQ	2202	5569	431
7153 2	CENTRAL SQUARE LYNN	HOLYOKE	5547	2202	432
7 48 2	CENTRAL SQUARE LYNN	PINE HILL	5551	2202	433
7213 2	CENTRAL SQUARE LYNN	LAKSHORE PARK	2202	2470	435
7236 1	LAKE SHORE PARK	CENTRAL SQ LYNN	2470	2202	435
7214 2	CENTRAL SQUARE LYNN	LIBERTY TREE	2202	5907	435-1
7151 2	CENTRAL SQUARE LYNN	HAPPY VALLEY	2202	5556	436
7 50 2	CENTRAL SQUARE LYNN	LAKESIDE	5554	2202	437
7138 2	CENTRAL SQUARE LYNN	NAHANT	2202	5915	439
7222 2	CENTRAL SQUARE LYNN	MARBLEHEAD PARADISE	5911	6838	441
7223 2	CENTRAL SQUARE LYNN	MARBLEHEAD HUMPHREY	5911	6838	442
7224 2	CENTRAL SQUARE LYNN	SWAMPSCOTT	2202	5573	444-2
7216 2	SALEM CTR	NO BEVERLY	2204	6102	451
7217 2	SALEM CTR	SALEM WILLOW	2204	5587	453
7219 2	SALEM CTR	MARBLEHEAD	2204	5911	454

7218 2 CENTRAL SQUARE LYNN	SALEM LORING	2204 2202 455
7 49 2 CENTRAL SQUARE LYNN	FAYES AVE	6065 2202 456
7221 2 SALEM CTR	OAKLAND ST	5580 2204 457
7215 2 SALEM CTR	DANVERS SQ	2204 5906 458-4
7220 2 SALEM CTR	SALEM COLLE	2204 6168 461
7140 2 SALEM	DANVERS STATE HOSP	2204 6125 468-4
7200 2 ROBERTS	NEWTON CNR	2275 2648 520
7201 2 NEWTON CNR	WAVERLY	2773 5805 521
7235 2 WAVERLEY	NEWTON CORNER WARREN	2273 5805 521-WAR
7207 1 WALTHAM	NEWTON CNR	6006 2648 522-2
7208 1 NEWTON CNR	WALTHAM	5805 6006 522-2
7197 1 CENTRAL SQCA	WALTHAM WATT	1864 6002 523-3
7198 1 WALTHAM WATT	CENTRAL SQCA	6002 1864 523-3
7205 1 WALTHAM	LEXINGTON	2274 2269 525-1
7206 1 LEXINGTON	WALTHAM	2269 2274 525-1
7199 2 AUBURNDALE	NEWTON CNR	5435 2648 527-1
7203 2 ARLMONT	HANSCOM BASE	6023 2516 528
7202 2 ARLINGTON	BEDFORD HSPL	6025 5847 529
7204 2 FIVE FORKS	ARLINGTON CT	6022 5855 530-5
7212 2 FRAMINGHAM	NEWTON CNR	2648 2310 531
7209 2 NEEDHAM	WATERTOWN	5831 2326 532
7210 1 WATERTOWN SQ	CHARLES RVR	1848 5866 533
7211 1 CHARLES RVR	WATERTOWN	5458 5831 533
7234 2 BRAINTREE EXTENSION		5389 1868 992-6
7233 2 BRAINTREE EXTENSION		1870 5393 993-5
7232 2 BRAINTREE EXTENSION		1868 5395 994-4
7231 1 BRAINTREE EXTENSION		1868 5390 995-3
7230 1 BRAINTREE EXTENSION		5390 1868 996-3
7229 2 BRAINTREE EXTENSION		1870 5506 997-2
7228 2 BRAINTREE EXTENSION		5393 1869 999-1

CTPS.QNET80.TABLE.SUMMARY.MODE8*****START

8 1 1 RIVERSIDE	COPLEY	1934 1883	MBTA 303
8 2 1 COPLEY	RIVERSIDE	1883 1934	MBTA 303
8 3 1 RIVERSIDE	SUMMER & CHAUNCY	1934 1847	MBTA 300
8 4 1 SUMMER & CHAUNCY	RIVERSIDE	1847 1934	MBTA 300
8 5 1 WATERTOWN	COPLEY	5831 1883	MBTA 302
8 6 1 COPLEY	WATERTOWN	1883 5831	MBTA 302
8 7 1 WATERTOWN	SUMMER & CHAUNCY	5831 1847	MBTA 304
8 8 1 SUMMER & CHAUNCY	WATERTOWN	1847 5831	MBTA 304
8 9 1 BRIGHTON CENTER	SUMMER & CHAUNCY	5688 1847	MBTA 301
8 10 1 SUMMER & CHAUNCY	BRIGHTON CENTER	1847 5688	MBTA 301
8 11 1 WALTHAM	SUMMER & CHAUNCY	2274 1847	MBTA 305
8 12 1 SUMMER & CHAUNCY	WALTHAM	1847 2274	MBTA 305
8 13 2 ELM ST MEDFORD	HAYMARKET	5740 1821	MBTA 325
8 14 2 W MEDFORD	HAYMARKET	5746 1821	MBTA 326
8 15 1 BURLINGTON	BOSTON PARK SQ	2514 5332	MBTA 700-2
8 16 1 BOSTON PARK SQ	BURLINGTON	5332 2514	MBTA 700-2
8 17 1 BURLINGTON VIA I-93	BOSTON PARK SQ	2514 5332	MBTA 701-4
8 18 1 BOSTON PARK SQ	BURLINGTON VIA I-93	5332 2514	MBTA 701-4
8 19 1 CENTRAL SQ LYNN	BOSTON VIA CLIFT	2202 1821	MBTA 426
8 20 1 BOSTON VIA CLIFT	CENTRAL SQ LYNN	1821 2202	MBTA 426
8 21 2 SALEM	BOSTON	2204 1821	MBTA 450
8 23 2 CENTRAL SQ LYNN	BOSTON VIA GE BRIDGE	2202 1821	MBTA 440
8 25 2 CENTRAL SQ LYNN	BOSTON VIA WESTERN	2202 1821	MBTA 400
8 29 1 WORCESTER	BOSTON	2578 5323	RITCHIE BUS LINES
8 30 1 BOSTON	WORCESTER	5323 2578	RITCHIE BUS LINES
8 31 2 WORCESTER	BOSTON VIA RTE 9	2578 6838	GREYLINE
8 32 1 FRAMINGHAM	BOSTON VIA RTE 9	6780 5332	GREYLINE
8 33 1 SHOPPERS WORLD FRAM	BOSTON VIA RTE 9	6785 5332	GREYLINE
8 34 1 BOSTON	FRAMINGHAM	5332 6780	GREYLINE
8 35 1 FITCHBURG	BOSTON	2690 6945	ENGLANDER COACH
8 36 1 BOSTON	FITCHBURG	6945 2690	ENGLANDER COACH
8 37 1 MILFORD	BOSTON SOUTH STATION	2410 5323	BRUSH HILL TRANS
8 38 1 BOSTON SOUTH STATION	MILFORD	5323 2410	BRUSH HILL TRANS
8 39 1 HAVERHILL	BOSTON	6700 6945	BOSTON COMMUTER
8 40 1 BOSTON	HAVERHILL	6945 6700	BOSTON COMMUTER
8 41 1 AMESBURY	BOSTON	6717 6945	BOSTON COMMUTER
8 42 1 BOSTON	AMESBURY	6945 6717	BOSTON COMMUTER
8 43 1 BEVERLY	BOSTON	6731 5332	HUDSON BUS LINES
8 44 1 BOSTON	BEVERLY	5332 6731	HUDSON BUS LINES
8 45 1 BOSTON	PEABODY CENTER	5332 6733	HUDSON BUS LINES
8 46 1 PEABODY CENTER	BOSTON	6733 5332	HUDSON BUS LINES
8 47 1 BOSTON	PEABODY RUSSELL PLAZA	5332 6732	HUDSON BUS LINES
8 48 1 PEABODY RUSSELL PLAZA	BOSTON	6732 5332	HUDSON BUS LINES
8 50 1 LAWRENCE	BOSTON	6840 5332	TROMBLEY MOTOR
8 51 1 BOSTON	LAWRENCE	5332 6840	TROMBLEY MOTOR

8 52 1	LOWELL	BOSTON	6433	5332	TROMBLEY MOTOR
8 53 1	BOSTON	LOWELL	5332	6433	TROMBLEY MOTOR
8 54 1	WHITMAN	ASHMONT	6494	1855	HUDSON BUS LINES
8 55 1	ASHMONT	WHITMAN	1855	6494	HUDSON BUS LINES
8 56 1	SOUTH WEYMOUTH	ASHMONT	6499	1855	HUDSON BUS LINES
8 57 1	COLUMBIA SQ	ASHMONT	6609	1855	HUDSON BUS LINES
8 58 1	ASHMONT	ROCKLAND	1855	6603	HUDSON BUS LINES
8 59 1	BROCKTON	BOSTON	6474	6945	PLYMOUTH & BROCK
8 60 1	BOSTON	BROCKTON	6945	6474	PLYMOUTH & BROCK
8 61 1	DUXBURY KINGSTON	BOSTON	2432	6945	PLYMOUTH & BROCK
8 62 1	BOSTON	DUXBURY KINGSTON	6945	2432	PLYMOUTH & BROCK
8 63 1	DUXBURY	BOSTON	6629	6945	PLYMOUTH & BROCK
8 64 1	BOSTON	DUXBURY	6945	6629	PLYMOUTH & BROCK
8 65 1	MARSHFIELD GR HARBOR	BOSTON	6634	6945	PLYMOUTH & BROCK
8 66 1	BOSTON	MARSHFIELD GR HARBOR	6945	6634	PLYMOUTH & BROCK
8 67 1	PEMBROKE	BOSTON	7171	6945	PLYMOUTH & BROCK
8 68 1	BOSTON	PEMBROKE	6945	7171	PLYMOUTH & BROCK
8 69 1	SCITUATE	BOSTON	6643	6945	PLYMOUTH & BROCK
8 70 1	BOSTON	SCITUATE	6945	6643	PLYMOUTH & BROCK
8 71 1	ANDOVER	BOSTON	2243	5332	TROMBLY MOTOR CH
8 72 2	(FOXBORO) PROVIDENCE	BOSTON (LOGAN AIRPORT)	6950	6805	BONANZA
8 73 1	BRIDGEWATER	BOSTON	6500	6945	ALMEIDA BUS LINES
8 75 1	PLAINVILLE	BOSTON	6930	6945	A. B. C. INC
8 76 1	BOSTON	PLAINVILLE	6945	6930	A. B. C. INC
8 77 1	STONEHAM	SULLIVAN STATION	6749	1836	HUDSON BUS LINES
8 78 1	SULLIVAN STATION	STONEHAM	1836	6749	HUDSON BUS LINES
8 79 2	RTE128 STA SSPLAZA	HAYMARKET	2335	6838	HUDSON BUS LINES
8 80 1	FACTORY PAINT SO WEY	HAYMARKET	6650	6838	HUDSON BUS LINES
8 81 2	FACTORY PAINT WEY LDG	HAYMARKET	6650	6838	HUDSON BUS LINES
8 82 1	COL SQ SSPLAZA	HAYMARKET	6609	6838	HUDSON BUS LINES
8 83 1	COL SQ WEY LANDING	HAYMARKET	6609	6838	HUDSON BUS LINES
8 84 2	HINGHAM E WEYMOUTH	HAYMARKET	5342	6838	HUDSON BUS LINES
8 85 1	HAYMARKET	COL SQ WEYMOUTH	6838	6609	HUDSON BUS LINES
8 86 1	HAYMARKET	COL SQ FACTORY PAINT	6838	6650	HUDSON BUS LINES
8 87 1	CANTON RTE 138	S. STATION & GREYHOUND	6411	6945	BRUSH HILL BUS
8 88 1	BOSTON	CANTON RTE 138	6945	6411	BRUSH HILL BUS
8 89 1	HAYMARKET	SSPLAZA RTE 128 STATION	6838	2355	HUDSON BUS LINES

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CTPS.QNET80.TABLE.SUMMARY.MODE8

CTPS

TABLE
C-3-6b

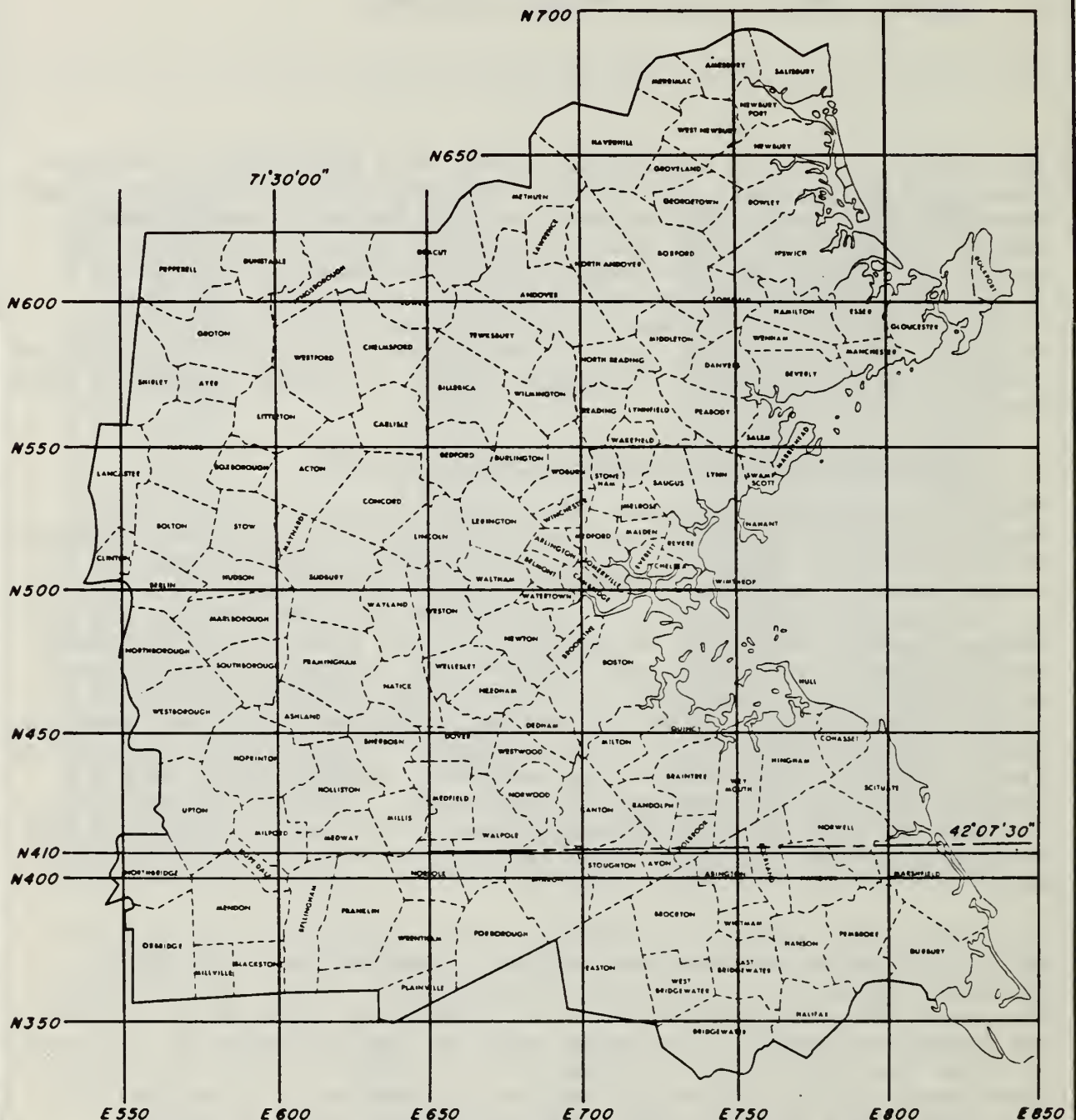
D. TRANSIT NETWORK MAPS DEVELOPED AND USED

Many maps of various scales and forms have been used in connection with the transit inventory. The State Plane Coordinate Map System is the basic system used for the Eastern Massachusetts region. These maps are used as the base maps to determine the coordinates used for the nodes and to determine the general layout of the routes considered in the inventory. The MDPW Official Transportation map shows the location of important shopping centers, parks, etc. The various references are helpful aids in the laying down of routes, stops and other necessary data for the UNET data file.

D.1 MASSACHUSETTS STATE PLANE COORDINATE MAP

This is the base-map system used in the transit study. See Figure D-1. It is also known as the General Highway Map, County Series, and was prepared for the Massachusetts Department of Public Works, Bureau of Transportation Planning and Development, in cooperation with the U.S. Department of Commerce, Bureau of Public Roads. As shown in Figure D-1, the base grid coordinate system used is an orthogonal system with reference axes aligned at a specific latitude and longitude. The grid is spaced at 10,000-foot intervals and is labeled along the longitude axis as E600 (the last three zeros are omitted). This line is aligned on the 71 degree 30'00" longitude meridian, which occurs in the western section of the region under study. The N410, E600 axis is located in the southeastern corner of Milford. Note that the 42 degree 07'30" latitude line bends upwards away from the N410 axis.

Latitude and longitude are shown on the county series maps as solid tic marks and are the Polyconic Projection, 1927 North American Datum, at 7 1/2 minute intervals. Also, the Universal Traverse Mercator Grid Zone 19 at 5000-meter intervals is shown as dashed tic marks. The maps used for the majority of the area outside the CBD are at a scale of 1" = 2000 ft. Within an area near Route 128, a series of maps with a scale of 1" = 1000 ft. was used. For the CBD area, the peninsular area of Boston proper, a map with a scale of 1" = 400 ft. was used. Fourteen map sections were used in laying down the transit routes in the region. They are shown in Figure D-2 as follows:



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MASSACHUSETTS STATE
PLANE COORDINATE SYSTEM

CTPS

FIGURE
D-1

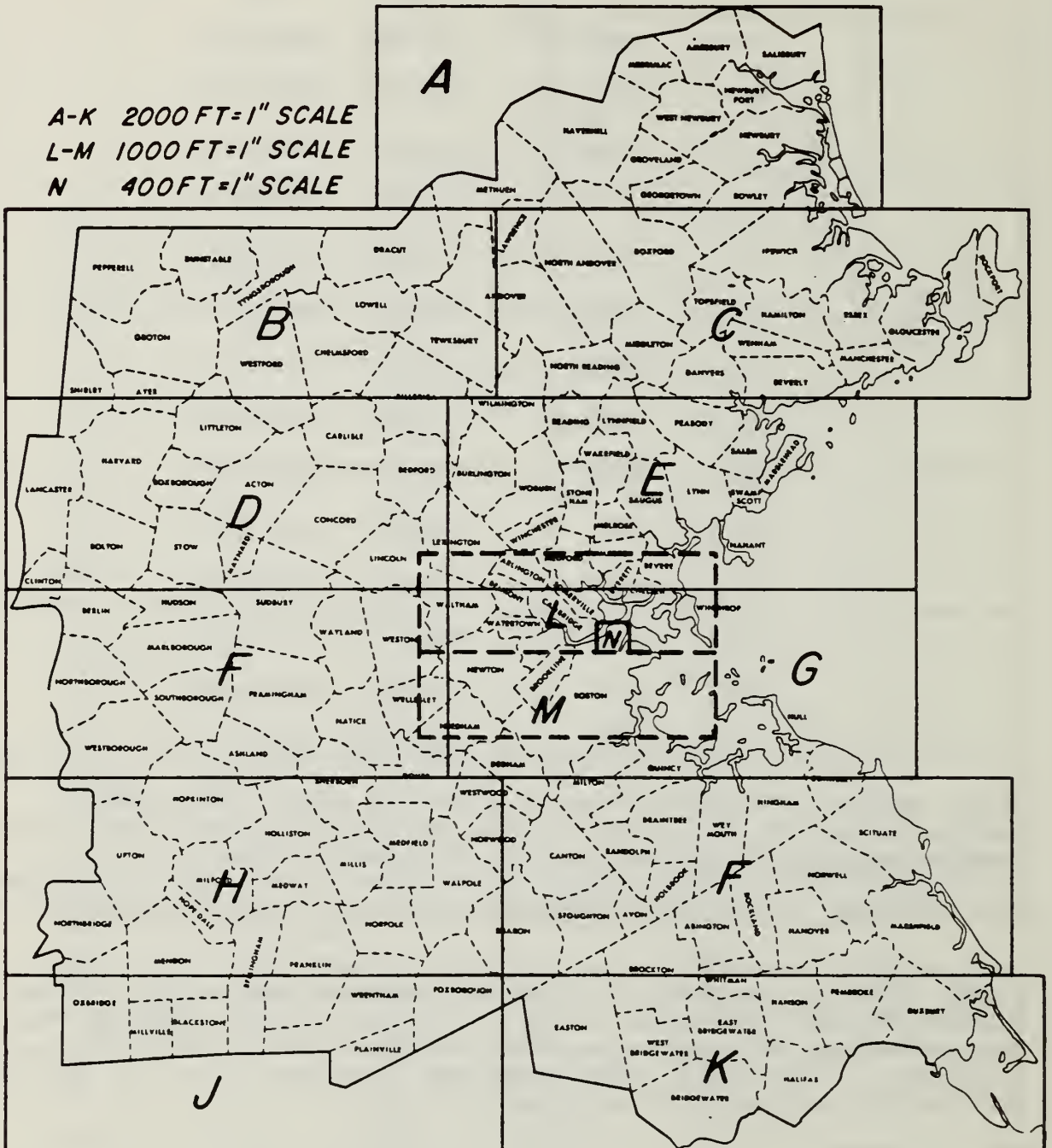
<u>Section</u>	<u>Scale</u>	<u>Region Encompassed</u>	
		<u>N</u>	<u>E</u>
A	2000 ft.	630-690	650-800
B	2000 ft.	570-630	540-685
C	2000 ft.	570-630	685-850
D	2000 ft.	510-570	540-670
E	2000 ft.	510-570	670-800
F	2000 ft.	450-510	540-670
G	2000 ft.	450-510	670-810
H	2000 ft.	390-450	540-685
I	2000 ft.	390-450	685-830
J	2000 ft.	350-390	540-685
K	2000 ft.	330-390	685-840
L	1000 ft.	488-530	660-750
M	1000 ft.	447-490	660-722
N	400 ft.	490-500	715-722

These map sections have been prepared on mylar. The symbols representing the link nomenclature and other symbols and various node representations are shown in Figures D-3 and D-4.

D.2 SUMMARY OF QNET80, TOWN NAME, CTPS NO. AND MAP LOCATION

Tables D-1, D-2, and D-3 may be used to cross-reference town names, CTPS zones, and the transit-inventory maps. For example, BOSTON CBD has CTPS zone numbers 1-60 and may be found on Map N. The three tables have been sorted on (A) CTPS ZONE NUMBER (columns 2, 5, 8), (B) ZONE/TOWN NAME (columns 1, 4, 7), and (C) MAP/LETTER DESIGNATION (columns 3, 6, 9).

A-K 2000 FT=1" SCALE
 L-M 1000 FT=1" SCALE
 N 400 FT=1" SCALE



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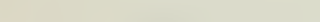
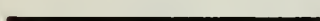



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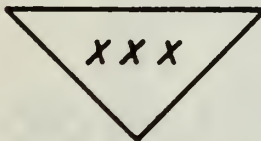
TRANSIT INVENTORY MAPS A-N:
 AREAS COVERED

CTPS

FIGURE

D-2

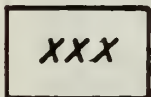
-  *Walk Mode 1*
-  *Auto Access Mode 2*
-  *Auto Access Mode 3*
-  *Commuter Rail Mode 4*
-  *Rapid Rail Transit Mode 5*
-  *Non-MBTA Bus Mode 6*
-  *MBTA Local Bus Mode 7*
-  *MBTA Express Bus Mode 8*



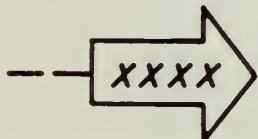
Transit Route Terminus



Intermediate Route Descriptors



Auto Access Connector (zone centroid)



Auto Access Connection (to station number)

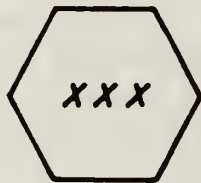


(xxxx) Subsequent Node on Adjacent Map

Note: *Mode 6—Use line numbers from 1 to xxx as local bus route identifiers.*

—For express bus, start line numbers from 255 and count down.

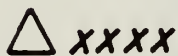
—A total of 255 lines are possible.



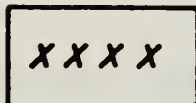
Zone Centroid



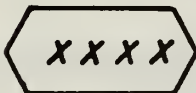
Zone Centroid (Displaced for Clarity)



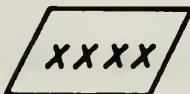
*Town Boundary Node for Bus Lines Only
(See Coordinate Card "4" Columns 41-46
for Town Numbers)*



Rail Rapid Transit Station



Commuter Rail Station



Express Bus Stop



All Other Nodes

CTPS NO	ZONE/TOWN NAME	MAP	CTPS NO	ZONE/TOWN NAME	MAP
001	BOSTON/FINANCIAL-RET	N	*262 268	REVERE	EL *
002	BOSTON/PARK SQUARE	N	*269 279	MEDFORD	L *
003	BOSTON/GOVT CENTER	N	*280 288	MALDEN	EL *
004 006	BOSTON/FINANCIAL-RET	N	*289 295	EVERETT	L *
007 008	BOSTON/WATERFRONT	N	*296 299	MELROSE	EL *
009 010	BOSTON/GOVT CENTER	N	*300 302	STONEHAM	E *
011	BOSTON/FINANCIAL-RET	N	*303 307	WINCHESTER	EL *
012	BOSTON/GOVT CENTER	N	*308 313	WOBURN	EL *
013	BOSTON/FINANCIAL-RET	N	*314 321	BELMONT	L *
014	BOSTON/WATERFRONT	N	*322 328	ARLINGTON	L *
015 019	BOSTON/NORTH END	N	*329 339	WALTHAM	M *
020 022	BOSTON/GOVT CENTER	N	*340 343	WATERTOWN	G *
023	BOSTON/NORTH END	N	*344 360	NEWTON	G *
024	BOSTON/BEACON HILL	N	*361	NAHANT	G *
025	BOSTON/NORTH END	N	*362 363	SWAMPSCOTT	E *
026 028	BOSTON/BEACON HILL	N	*364 385	LYNN	E *
029 032	BOSTON/BACK BAY	N	*386 389	SAUGUS	EL *
033	BOSTON/PARK SQUARE	N	*390 393	WAKEFIELD	E *
034	BOSTON/SOUTH END	N	*394 395	LYNNFIELD	CE *
035	BOSTON/PRUDENTIAL	N	*396 402	PEABODY	CE *
036	BOSTON/SOUTH END	N	*403 407	DANVERS	CE *
037 043	BOSTON/PRUDENTIAL	N	*408	WENHAM	C *
044 052	BOSTON/SOUTH END	N	*409	BURLINGTON	E *
053 054	BOSTON/PARK SQUARE	N	*410	READING	CE *
055 060	BOSTON/SOUTH END	N	*411	MARBLEHEAD	E *
061 072	BOSTON/EAST BOSTON	N	*412 418	SALEM	E *
073 080	BOSTON/CHARLESTOWN	N	*419 424	BEVERLY	CE *
081 094	BOSTON/SO BOSTON	N	*425	MANCHESTER	C *
095 098	BOSTON/FENWAY-P.HILL	N	*426 429	WELLESLEY	FM *
099 105	BOSTON/ROXBURY	N	*430 431	WESTON	F *
106 109	BOSTON/FENWAY-P.HILL	N	*432 436	NEEDHAM	M *
110	BOSTON/JAMAICA PLAIN	N	*437 439	LEXINGTON	DEL *
111 130	BOSTON/ROXBURY	N	*440 441	DEDHAM	IM *
131 144	BOSTON/NO DORCHESTER	N	*442 443	WESTWOOD	HIM *
145 156	BOSTON/SO DORCHESTER	N	*444 446	CANTON	I *
157 160	BOSTON/MATTAPAN	N	*447 450	MILTON	IM *
161	BOSTON/ROXBURY	N	*451 462	QUINCY	IM *
162	BOSTON/JAMAICA PLAIN	N	*463 465	RANDOLPH	I *
163 167	BOSTON/ROSLINDALE	N	*466 473	BRAINTREE	IM *
168 174	BOSTON/JAMAICA PLAIN	N	*474 479	WEYMOUTH	I *
175 178	BOSTON/WEST ROXBURY	N	*480	ROCKPORT	C *
179 184	BOSTON/HYDE PARK	N	*481	GLOUCESTER	C *
185 192	BOSTON/ALLSTON-BRHTN	N	*482	ESSEX	C *
193	LOGAN AIRPORT	L	*483	HAMILTON	C *
194 199	CHELSEA	L	*484	IPSWICH	C *
200 229	CAMBRIDGE	L	*485	TOPSFIELD	C *
230 244	SOMERVILLE	L	*486	MIDDLETON	C *
245 256	BROOKLINE	LM	*487	NORTH READING	C *
257 261	WINTHROP	L	*488	WILMINGTON	BCE *

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CTPS NO	ZONE/TOWN NAME	MAP	CTPS NO	ZONE/TOWN NAME	MAP
489	BEDFORD	DE	*545	ROWLEY	AC *
490	LINCOLN	D	*546	AMESBURY	A *
491	CARLISLE	D	*547	WEST NEWBURY	A *
492	CONCORD	D	*548	GROVELAND	A *
493	ACTON	D	*549	GEORGETOWN	AC *
494	LITTLETON	BD	*550	BOXFORD	AB *
495	BOXBOROUGH	D	*551	MERRIMAC	A *
496	BOLTON	DF	*552	HAVERHILL	A *
497	STOW	DF	*553	NORTH ANDOVER	AC *
498	MAYNARD	D	*554	METHUEN	AB *
499	SUDBURY	DF	*555	LAWRENCE	ABC*
500	WAYLAND	DF	*556	ANDOVER	BC *
501	505 FRAMINGHAM	F	*557	DRACUT	AB *
506	HUDSON	DF	*558	TEWKSBURY	BC *
507	MARLBOROUGH	F	*559	LOWELL	B *
508	SOUTHBOROUGH	F	*560	BILLERICA	BD *
509	ASHLAND	F	*561	TYNSBOROUGH	B *
510	513 NATICK	F	*562	CHELMSFORD	BD *
514	SHERBORN	FH	*563	WESTFORD	BD *
515	HOPKINTON	FH	*564	DUNSTABLE	B *
516	HOLLISTON	H	*565	PEPPERELL	B *
517	MILFORD	H	*566	GROTON	B *
518	MEDWAY	H	*567	AYER	BD *
519	MILLIS	H	*568	SHIRLEY	BD *
520	MEDFIELD	H	*569	HARVARD	D *
521	DOVER	FH	*570	LANCASTER	D *
522	NORWOOD	HI	*571	CLINTON	DF *
523	WALPOLE	H	*572	BERLIN	D *
524	NORFOLK	H	*573	NORTHBOROUGH	F *
525	FRANKLIN	HJ	*574	WESTBOROUGH	FH *
526	BELLINGHAM	HJ	*575	UPTON	H *
527	WRENTHAM	HJ	*576	HOPEDALE	H *
528	FOXBOROUGH	HJ	*577	MENDON	HJ *
529	SHARON	IK	*578	NORTHBRIDGE	H *
530	STOUGHTON	I	*579	UXBRIDGE	HJ *
531	HOLBROOK	I	*580	MILLVILLE	J *
532	ROCKLAND	I	*581	BLACKSTONE	J *
533	HULL	M	*582	PLAINVILLE	J *
534	HINGHAM	IM	*583	EASTON	IK *
535	COHASSET	IM	*584	AVON	I *
536	SCITUATE	IM	*585	BROCKTON	IK *
537	NORWELL	I	*586	ABINGTON	I *
538	HANOVER	I	*587	WHITMAN	IK *
539	PEMBROKE	IK	*588	EAST BRIDGEWATER	K *
540	MARSHFIELD	IK	*589	WEST BRIDGEWATER	K *
541	DUXBURY	IK	*590	BRIDGEWATER	K *
542	SALISBURY	A	*591	HANSON	IK *
543	NEWBURYPORT	A	*592	HALIFAX	K *
544	NEWBURY	A	*		

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ZONE/TOWN NAME	CTPS NO	MAP	ZONE/TOWN NAME	CTPS NO	MAP
ABINGTON	586	I	*BOSTON/ROXBURY	099 105	N *
ACTON	493	D	*BOSTON/SO BOSTON	081 094	N *
AMESBURY	546	A	*BOSTON/SO DORCHESTER	145 156	N *
ANDOVER	556	BC	*BOSTON/SOUTH END	034	N *
ARLINGTON	322 328	L	*BOSTON/SOUTH END	036	N *
ASHLAND	509	F	*BOSTON/SOUTH END	044 052	N *
AVON	584	I	*BOSTON/SOUTH END	055 060	N *
AYER	567	BD	*BOSTON/WATERFRONT	014	N *
BEDFORD	489	DE	*BOSTON/WATERFRONT	007 008	N *
BELLINGHAM	526	HJ	*BOSTON/WEST ROXBURY	175 178	N *
BELMONT	314 321	L	*BOXBOROUGH	495	D *
BERLIN	572	D	*BOXFORD	550	AB *
BEVERLY	419 424	CE	*BRAINTREE	466 473	IM *
BILLERICA	560	BD	*BRIDGEWATER	590	K *
BLACKSTONE	581	J	*BROCKTON	585	IK *
BOLTON	496	DF	*BROOKLINE	245 256	LM *
BOSTON/ALLSTON-BRHTN	185 192	N	*BURLINGTON	409	E *
BOSTON/BACK BAY	029 032	N	*CAMBRIDGE	200 229	L *
BOSTON/BEACON HILL	026 028	N	*CANTON	444 446	I *
BOSTON/BEACON HILL	024	N	*CARLISLE	491	D *
BOSTON/CHARLESTOWN	073 080	N	*CHELMSFORD	562	BD *
BOSTON/EAST BOSTON	061 072	N	*CHELSEA	194 199	L *
BOSTON/FENWAY-P.HILL	095 098	N	*CLINTON	571	DF *
BOSTON/FENWAY-P.HILL	106 109	N	*COHASSET	535	IM *
BOSTON/FINANCIAL-RET	004 006	N	*CONCORD	492	D *
BOSTON/FINANCIAL-RET	013	N	*DANVERS	403 407	CE *
BOSTON/FINANCIAL-RET	001	N	*DEDHAM	440 441	IM *
BOSTON/FINANCIAL-RET	011	N	*DOVER	521	FH *
BOSTON/GOVT CENTER	012	N	*DRACUT	557	AB *
BOSTON/GOVT CENTER	020 022	N	*DUNSTABLE	564	B *
BOSTON/GOVT CENTER	009 010	N	*DUXBURY	541	IK *
BOSTON/GOVT CENTER	003	N	*EAST BRIDGEWATER	588	K *
BOSTON/HYDE PARK	179 184	N	*EASTON	583	IK *
BOSTON/JAMAICA PLAIN	110	N	*ESSEX	482	C *
BOSTON/JAMAICA PLAIN	162	N	*EVERETT	289 295	L *
BOSTON/JAMAICA PLAIN	168 174	N	*FOXBOROUGH	528	HJ *
BOSTON/MATTAPAN	157 160	N	*FRAMINGHAM	501 505	F *
BOSTON/NO DORCHESTER	131 144	N	*FRANKLIN	525	HJ *
BOSTON/NORTH END	015 019	N	*GEORGETOWN	549	AC *
BOSTON/NORTH END	023	N	*GLOUCESTER	481	C *
BOSTON/NORTH END	025	N	*GROTON	566	B *
BOSTON/PARK SQUARE	002	N	*GROVELAND	548	A *
BOSTON/PARK SQUARE	033	N	*HALIFAX	592	K *
BOSTON/PARK SQUARE	053 054	N	*HAMILTON	483	C *
BOSTON/PRUDENTIAL	035	N	*HANOVER	538	I *
BOSTON/PRUDENTIAL	037 043	N	*HANSON	591	IK *
BOSTON/ROSLINDALE	163 167	N	*HARVARD	569	D *
BOSTON/ROXBURY	111 130	N	*HAVERHILL	552	A *
BOSTON/ROXBURY	161	N	*HINGHAM	534	IM *

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ZONE/TOWN NAME	CTPS	NO	MAP	ZONE/TOWN NAME	CTPS	NO	MAP
HOLBROOK	531		I	*PEPPERELL	565		B *
HOLLISTON	516		H	*PLAINVILLE	582		J *
HOPEDALE	576		H	*QUINCY	451	462	IM *
HOPKINTON	515		FH	*RANDOLPH	463	465	I *
HUDSON	506		DF	*READING	410		CE *
HULL	533		M	*REVERE	262	268	EL *
IPSWICH	484		C	*ROCKLAND	532		I *
LANCASTER	570		D	*ROCKPORT	480		C *
LAWRENCE	555		ABC	*ROWLEY	545		AC *
LEXINGTON	437	439	DEL	*SALEM	412	418	E *
LINCOLN	490		D	*SALISBURY	542		A *
LITTLETON	494		BD	*SAUGUS	386	389	EL *
LOGAN AIRPORT	193		L	*SCITUATE	536		IM *
LOWELL	559		B	*SHARON	529		IK *
LYNN	364	385	E	*SHERBORN	514		FH *
LYNNFIELD	394	395	CE	*SHIRLEY	568		BD *
MALDEN	280	288	EL	*SOMERVILLE	230	244	L *
MANCHESTER	425		C	*SOUTHBOROUGH	508		F *
MARBLEHEAD	411		E	*STONEHAM	300	302	E *
MARLBOROUGH	507		F	*STOUGHTON	530		I *
MARSHFIELD	540		IK	*STOW	497		DF *
MAYNARD	498		D	*SUDBURY	499		DF *
MEDFIELD	520		H	*SWAMPSCOTT	362	363	E *
MEDFORD	269	279	L	*TEWKSBURY	558		BC *
MEDWAY	518		H	*TOPSFIELD	485		C *
MELROSE	296	299	EL	*TYNSBOROUGH	561		B *
MENDON	577		HJ	*UPTON	575		H *
MERRIMAC	551		A	*UXBRIDGE	579		HJ *
METHUEN	554		AB	*WAKEFIELD	390	393	E *
MIDDLETON	486		C	*WALPOLE	523		H *
MILFORD	517		H	*WALTHAM	329	339	M *
MILLIS	519		H	*WATERTOWN	340	343	G *
MILLVILLE	580		J	*WAYLAND	500		DF *
MILTON	447	450	IM	*WELLESLEY	426	429	FM *
NAHANT	361		G	*WENHAM	408		C *
NATICK	510	513	F	*WEST BRIDGEWATER	589		K *
NEEDHAM	432	436	M	*WEST NEWBURY	547		A *
NEWBURY	544		A	*WESTBOROUGH	574		FH *
NEWBURYPORT	543		A	*WESTFORD	563		BD *
NEWTON	344	360	G	*WESTON	430	431	F *
NORFOLK	524		H	*WESTWOOD	442	443	HIM*
NORTH ANDOVER	553		AC	*WEYMOUTH	474	479	I *
NORTH READING	487		C	*WHITMAN	587		IK *
NORTHBOROUGH	573		F	*WILMINGTON	488		BCE*
NORTHBRIDGE	578		H	*WINCHESTER	303	307	EL *
NORWELL	537		I	*WINTHROP	257	261	L *
NORWOOD	522		HI	*WOBURN	308	313	EL *
PEABODY	396	402	CE	*WRENTHAM	527		HJ *
PEMBROKE	539		IK	*			

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MAP	ZONE/TOWN NAME	CTPS NO	MAP	ZONE/TOWN NAME	CTPS NO
A	AMESBURY	546	*D	HARVARD	569 *
A	GROVELAND	548	*D	LANCASTER	570 *
A	HAVERHILL	552	*D	LINCOLN	490 *
A	MERRIMAC	551	*D	MAYNARD	498 *
A	NEWBURY	544	*DE	BEDFORD	489 *
A	NEWBURYPORT	543	*DEL	LEXINGTON	437 439*
A	SALISBURY	542	*DF	BOLTON	496 *
A	WEST NEWBURY	547	*DF	CLINTON	571 *
AB	BOXFORD	550	*DF	HUDSON	506 *
AB	DRACUT	557	*DF	STOW	497 *
ABC	LAWRENCE	555	*DF	SUDBURY	499 *
AB	METHUEN	554	*DF	WAYLAND	500 *
AC	GEORGETOWN	549	*E	BURLINGTON	409 *
AC	NORTH ANDOVER	553	*E	LYNN	364 385*
AC	ROWLEY	545	*E	MARBLEHEAD	411 *
B	DUNSTABLE	564	*E	SALEM	412 418*
B	GROTON	566	*E	STONEHAM	300 302*
B	LOWELL	559	*E	SWAMPSCOTT	362 363*
B	PEPPERELL	565	*E	WAKEFIELD	390 393*
B	TYNSBOROUGH	561	*EL	MALDEN	280 288*
BC	ANDOVER	556	*EL	MELROSE	296 299*
BC	TEWKSBURY	558	*EL	REVERE	262 268*
BCE	WILMINGTON	488	*EL	SAUGUS	386 389*
BD	AYER	567	*EL	WINCHESTER	303 307*
BD	BILLERICA	560	*EL	WOBURN	308 313*
BD	CHELMSFORD	562	*F	ASHLAND	509 *
BD	LITTLETON	494	*F	FRAMINGHAM	501 505*
BD	SHIRLEY	568	*F	MARLBOROUGH	507 *
BD	WESTFORD	563	*F	NATICK	510 513*
C	ESSEX	482	*F	NORTHBOROUGH	573 *
C	GLOUCESTER	481	*F	SOUTHBOROUGH	508 *
C	HAMILTON	483	*F	WESTON	430 431*
C	IPSWICH	484	*FH	DOVER	521 *
C	MANCHESTER	425	*FH	HOPKINTON	515 *
C	MIDDLETON	486	*FH	SHERBORN	514 *
C	NORTH READING	487	*FH	WESTBOROUGH	574 *
C	ROCKPORT	480	*FM	WELLESLEY	426 429*
C	TOPSFIELD	485	*G	NAHANT	361 *
C	WENHAM	408	*G	NEWTON	344 360*
CE	BEVERLY	419 424	*G	WATERTOWN	340 343*
CE	DANVERS	403 407	*H	HOLLISTON	516 *
CE	LYNNFIELD	394 395	*H	HOPEDALE	576 *
CE	PEABODY	396 402	*H	MEDFIELD	520 *
CE	READING	410	*H	MEDWAY	518 *
D	ACTON	493	*H	MILFORD	517 *
D	BERLIN	572	*H	MILLIS	519 *
D	BOXBOROUGH	495	*H	NORFOLK	524 *
D	CARLISLE	491	*H	NORTHBRIDGE	578 *
D	CONCORD	492	*H	UPTON	575 *

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MAP	ZONE/TOWN NAME	CTPS NO	MAP	ZONE/TOWN NAME	CTPS NO
H	WALPOLE	523	*L	WINTHROP	257 261*
HI	NORWOOD	522	*LM	BROOKLINE	245 256*
HIM	WESTWOOD	442 443	*M	HULL	533 *
HJ	BELLINGHAM	526	*M	NEEDHAM	432 436*
HJ	FOXBOROUGH	528	*M	WALTHAM	329 339*
HJ	FRANKLIN	525	*N	BOSTON/ALLSTON-BRHTN	185 192*
HJ	MENDON	577	*N	BOSTON/BACK BAY	029 032*
HJ	UXBRIDGE	579	*N	BOSTON/BEACON HILL	026 028*
HJ	WRENTHAM	527	*N	BOSTON/BEACON HILL	024 *
I	ABINGTON	586	*N	BOSTON/CHARLESTOWN	073 080*
I	AVON	584	*N	BOSTON/EAST BOSTON	061 072*
I	CANTON	444 446	*N	BOSTON/FENWAY-P. HILL	095 098*
I	HANOVER	538	*N	BOSTON/FENWAY-P. HILL	106 109*
I	HOLBROOK	531	*N	BOSTON/FINANCIAL-RET	004 006*
I	NORWELL	537	*N	BOSTON/FINANCIAL-RET	013 *
I	RANDOLPH	463 465	*N	BOSTON/FINANCIAL-RET	001 *
I	ROCKLAND	532	*N	BOSTON/FINANCIAL-RET	011 *
I	STOUGHTON	530	*N	BOSTON/GOVT CENTER	012 *
I	WEYMOUTH	474 479	*N	BOSTON/GOVT CENTER	020 022*
IK	BROCKTON	585	*N	BOSTON/GOVT CENTER	009 010*
IK	DUXBURY	541	*N	BOSTON/GOVT CENTER	003 *
IK	EASTON	583	*N	BOSTON/HYDE PARK	179 184*
IK	HANSON	591	*N	BOSTON/JAMAICA PLAIN	110 *
IK	MARSHFIELD	540	*N	BOSTON/JAMAICA PLAIN	162 *
IK	PEMBROKE	539	*N	BOSTON/JAMAICA PLAIN	168 174*
IK	SHARON	529	*N	BOSTON/MATTAPAN	157 160*
IK	WHITMAN	587	*N	BOSTON/NO DORCHESTER	131 144*
IM	BRAINTREE	466 473	*N	BOSTON/NORTH END	015 019*
IM	COHASSET	535	*N	BOSTON/NORTH END	023 *
IM	DEDHAM	440 441	*N	BOSTON/NORTH END	025 *
IM	HINGHAM	534	*N	BOSTON/PARK SQUARE	002 *
IM	MILTON	447 450	*N	BOSTON/PARK SQUARE	033 *
IM	QUINCY	451 462	*N	BOSTON/PARK SQUARE	053 054*
IM	SCITUATE	536	*N	BOSTON/PRUDENTIAL	035 *
J	BLACKSTONE	581	*N	BOSTON/PRUDENTIAL	037 043*
J	MILLVILLE	580	*N	BOSTON/ROSLINDALE	163 167*
J	PLAINVILLE	582	*N	BOSTON/ROXBURY	111 130*
K	BRIDGEWATER	590	*N	BOSTON/ROXBURY	161 *
K	EAST BRIDGEWATER	588	*N	BOSTON/ROXBURY	099 105*
K	HALIFAX	592	*N	BOSTON/ROXBURY	081 094*
K	WEST BRIDGEWATER	589	*N	BOSTON/ROXBURY	145 156*
L	ARLINGTON	322 328	*N	BOSTON/ROXBURY	034 *
L	BELMONT	314 321	*N	BOSTON/SOUTH END	036 *
L	CAMBRIDGE	200 229	*N	BOSTON/SOUTH END	044 052*
L	CHELSEA	194 199	*N	BOSTON/SOUTH END	055 060*
L	EVERETT	289 295	*N	BOSTON/SOUTH END	014 *
L	LOGAN AIRPORT	193	*N	BOSTON/WATERFRONT	007 008*
L	MEDFORD	269 279	*N	BOSTON/WATERFRONT	175 178*
L	SOMERVILLE	230 244	*	BOSTON/WEST ROXBURY	*

User's Guide to
CTPS Transit Network

Technical Report 49
April 1985

TOWN OR DISTRICT
AND CTPS ZONE NUMBER
BY TRANSIT INVENTORY MAP

CTPS

TABLE
D-3b

E. SAMPLE QNET80 DECK SETUP TO RUN UNET/UPATH

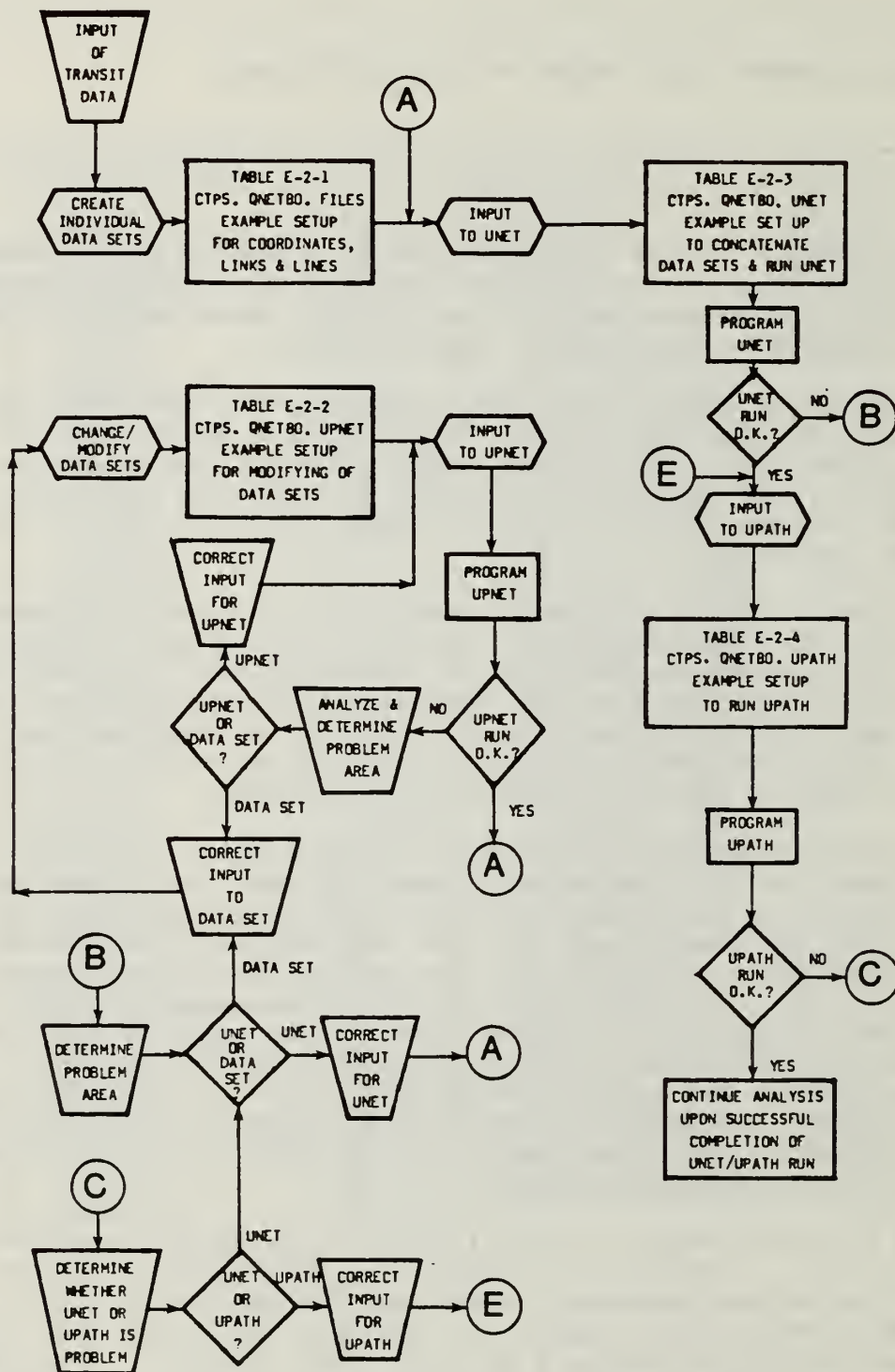
The requirements to use UNET/UPATH UTPS programs may be found in the report "Urban Transportation Planning System, Introduction" (May 1976). Later versions of this report have replaced UNET with INET and have made other changes also.

The flowchart in Figure E-1 shows how the four main sections of the sample deck setups shown in Tables E-1-1 through E-1-4 are related. The four tables show example setups for creating individual data sets, for making changes to existing data sets with the UPNET program, for running the UNET program, and for running the UPATH programs.

The data sets of coordinates, links, and lines may be created by using the UTILITIES program of IEBGENER, as shown in Table E-1-1. The coordinate data set is not required for UNET/UPATH as long as PLOT programs are not requested. These data sets may be created individually or as one data set if so desired, and the various procedures necessary to create the single data set for UNET will depend upon the base data sets used.

In the three IEBGENER formats for creating the three data sets, it is noted that '9' cards are placed between the three data sets. This is a requirement of the UNET program. The three data sets (or two data sets, as the case may be) are contiguous to the section STEPHEAD just prior to the execution of the program UNET. In Table E-1-2, the updating of the UNET data set is shown. This program is included as a method that may be used to add, modify, or change the coordinate, link, or line file as desired. Complete details for program UPNET may be found in "CTPS Software User's Guide." It should be noted that UPNET will replace the exact link card only, designated in ANODE/BNODE order (it does not test for BNODE/ANODE order).

The main data set may be maintained as a permanent data set on disk (or tape). Thus, by concatenating the various separate data sets in the proper sequence, with the STEPHEAD data set, a temporary data set may be created to operate UNET with the selected OPTION and SELECT parameters as input for the run. The example in Table E-1-3 shows UNET run individually, and the example in Table E-1-4 shows how the data set created by UNET is used as part of the input to run UPATH. Both UNET and UPATH can be run in sequential order in one run. Generally, UNET should be run first alone to determine if any LINK or LINE errors exist in the network files. Upon obtaining an error-free data set, the UPATH program may be used to obtain the desired paths.



CTPS.QNET80.FILES

```
@
/*-----
//SCRATCHX EXEC PGM=IEFBR14
//COORFILE DD UNIT=DISK,VOL=SER=DSK36C,DISP=(OLD,DELETE),
// DSN=CTPS.NEW.QNET80.COORDS
/*
//*****
//STEP COOR EXEC PGM=IEBGENER
//SYSPRINT DD SYSOUT=R
//SYSUT2 DD UNIT=DISK,VOL=SER=DSK36C,DISP=(NEW,KEEP),
// SPACE=(TRK,(1,1),RLSE),DCB=(RECFM=FB,LRECL=80,BLKSIZE=7200),
// DSN=CTPS.NEW.QNET80.COORDS
//SYSIN DD DUMMY
/* ----SAMPLE COORDINATE DATA SET INPUT-----
//SYSUT1 DD *
4 1 718400 494000
4 2 717900 493000
.
.
4 8191 731300 632200
/*
END OF COORDINATE DATA
//*****
/* A NINE CARD IS REQUIRED BETWEEN DATA SETS
//*****
//SCRATCHX EXEC PGM=IEFBR14
//LINKFILE DD UNIT=DISK,VOL=SER=DSK36C,DISP=(OLD,DELETE),
// DSN=CTPS.NEW.QNET80.LINKS
/*
//*****
//STEP LINK EXEC PGM=IEBGENER
//SYSPRINT DD SYSOUT=R
//SYSUT2 DD UNIT=DISK,VOL=SER=DSK36C,DISP=(NEW,KEEP),
// SPACE=(TRK,(1,1),RLSE),DCB=(RECFM=FB,LRECL=80,BLKSIZE=7200),
// DSN=CTPS.NEW.QNET80.LINKS
//SYSIN DD DUMMY
/* ----SAMPLE LINK DATA SET INPUT-----
//SYSUT1 DD *
99999999
1 8062 1806 3 15 80 80 602
.
.
1 7778 3866 3 101 230 230 1502
/*
END OF LINKS DATA
```

```

//*****
//* A NINE CARD IS REQUIRED BETWEEN DATA SETS
//*****
//SCRATCHX EXEC PGM=IEFBR14
//LINEFILE DD UNIT=DISK,VOL=SER=DSK36C,DISP=(OLD,DELETE),
// DSNAME=CTPS.NEW.QNET80.LINES
//*
//*****
//STEPLINE EXEC PGM=IEBGENER
//SYSPRINT DD SYSOUT=R
//SYSUT2 DD UNIT=DISK,VOL=SER=DSK36C,DISP=(NEW,KEEP),
// SPACE=(TRK,(1,1),RLSE),DCB=(RECFM=FB,LRECL=80,BLKSIZE=7200),
// DSNAME=CTPS.NEW.QNET80.LINES
//SYSIN DD DUMMY
//* ----SAMPLE LINE DATA SET INPUT-----
//SYSUT1 DD *
999999
2 5 1012 55 55 90 1870 1869 1868 1867 1866 1850 1849 1848 1847 RED LINE
2 5 1022 1846 1845 1865 1864 1863 1872 1873 1874 T RED LINE
.
2 7194212120100300 2516 5853 5846 6055 2519 5844 2624 1874 2622 8
2 719422 2621 5260 5261 2263 5255 5248 1863 T 8
/*
//
END OF LINK DATA
@

```

@
@

```

//-----
// * COPY OF UPNET LINK CHANGES FOR QNET80
//-----
//UPNET      PROC CORE=120K,XTIME=30,CLASS=M,OLDNET=DUMMY,NEWNET=DUMMY      00000010
// * CTPS PROCEDURE FOR 'UPNET'                                           00000020
//UPNET      EXEC PGM=UPNET,REGION=&CORE,TIME=&XTIME                        00000030
//STEPLIB    DD      DSN=CTPS.PROGLIB,UNIT=DISK,                           00000040
//              DISP=( SHR,CATLG),VOL=SER=DSK36C
//FT01F001   DD      DDNAME=SYSIN                                           00000050
//FT02F001   DD      &OLDNET,DISP=( OLD,PASS)                               00000060
//FT03F001   DD      &NEWNET,DISP=( ,KEEP),                                00000070
//              DCB=( RECFM=FB,LRECL=80,BLKSIZE=7200)                      00000080
//FT06F001   DD      SYSOUT=&CLASS                                           00000090
//FT30F001   DD      DSN=CTPS.PRGLLOG,UNIT=DISK,                           00000100
//              DISP=( SHR,CATLG),VOL=SER=DSK36C
//SORTLIB    DD      DSN=SYS1.SORTLIB,DISP=SHR,UNIT=DISK                  00000110
//SYSOUT     DD      SYSOUT=&CLASS                                           00000120
//SYSOUT2    DD      SYSOUT=&CLASS                                           00000130
//SYSPRINT   DD      SYSOUT=&CLASS                                           00000140
//SORTWK01   DD      UNIT=DISK,SPACE=(CYL,(1,1)),DISP=( ,DELETE),DSNAME=&WK01 00000150
//SORTWK02   DD      UNIT=DISK,SPACE=(CYL,(1,1)),DISP=( ,DELETE),DSNAME=&WK02 00000160
//SORTWK03   DD      UNIT=DISK,SPACE=(CYL,(1,1)),DISP=( ,DELETE),DSNAME=&WK03 00000170
//PROCEND    PEND
//*****
//SCRATCH   EXEC PGM=IEFBR14
//A          DD      UNIT=DISK,VOL=SER=TEMP01,DISP=(OLD,DELETE),
//          DSN=CTPS.NEW.QNET80.ALLDATA.NOHEAD.UPNET
//*****
//UPDTEXX   EXEC PGM=UPNET
//STEPLIB    DD      DSN=CTPS.PROGLIB,DISP=SHR,UNIT=DISK,VOL=SER=DSK36C
//SORTLIB    DD      DSN=SYS1.SORTLIB,DISP=SHR
//FT30F001   DD      DSN=CTPS.PRGLLOG,DISP=SHR,UNIT=DISK,VOL=SER=DSK36C
//SYSOUT     DD      SYSOUT=R
//SYSOUT2    DD      SYSOUT=R
//SYSPRINT   DD      SYSOUT=R
//SORTWK01   DD      UNIT=DISK,SPACE=(CYL,(2,1)),DSN=&KTEMP1,DISP=(NEW,PASS)
//SORTWK02   DD      UNIT=DISK,SPACE=(CYL,(2,1)),DSN=&KTEMP2,DISP=(NEW,PASS)
//SORTWK03   DD      UNIT=DISK,SPACE=(CYL,(2,1)),DSN=&KTEMP3,DISP=(NEW,PASS)

```

```
//FT02F001 DD DISP=(OLD,KEEP),
// UNIT=DISK,VOL=SER=DSK36C,
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=8000),
// DSN=CTPS.NEW.QNET80.ALDDATA.NOHEAD
//*****
//FT03F001 DD UNIT=DISK,VOL=SER=TEMP01,DISP=(NEW,KEEP),
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=7200),
// SPACE=(TRK,(10,10),RLSE),
// DSN=CTPS.KIN.QNET80.ALDDATA.NOHEAD.UPNET
//FT06F001 DD SYSOUT=R
//* ADD THE INPUT DATA IN FT01F001 FOR CORRECTIONS TO THE DATA SET
//* INSERT LINK CARDS TO BE UPDATED AFTER THE FT01F001 CARD
//* COLUMN 12 UPNET EDITING***BLANK ADD***R REPLACE***D DELETE**
//* LINE CARDS ARE ADDED UPNET CORRECTION IN COLUMN 9
//* O DELETE**1 ONEWAY ADD**2 TWOWAY ADD**3 ONEWAY REPLACE**
//*4 TWOWAY REPLACE**FOR LINE UPDATE
//*-----V-----V-----
1 164 1805D1
1 1863 1872 5 10 13 13 132 RED EXT PORTER SQ
1 5370 5369R7 1 5 5 42

.
.
.
2 5 314 55 55 90 1874 1873 1872 1863 1864 1865 1845 1846 1847 RED ASHM
2 5 324 1848 1849 1850 1851 1852 1853 1854 1855 TRED ASHM

.
.
.
2 719110
/*
//
//*****
@
```

```

//**-----
//** COPY OF UPNET LINK CHANGES FOR QNET80
//**-----
//*****STEPHEAD AND UNET SECTIONS TO FOLLOW*****
//** ERASE OLD DATA SET TO  CREATE A NEW DATA SET FILE*****
//**-----
//**
//SCRATCHX  EXEC PGM=IEFBR14
//HEADFILE  DD UNIT=DISK,VOL=SER=TEMP01,DISP=(OLD,DELETE),
//          DSN=CTPS.NEW.UNET80.HEADING
//**
//*****
//CLEARNET  EXEC PGM=IEHPRGM
//SYSPRINT  DD SYSOUT=R
//TEMP01    DD VOL=SER=TEMP01,DISP=OLD,UNIT=DISK
//DSK36C    DD VOL=SER=DSK36C,DISP=OLD,UNIT=DISK
//SYSIN     DD *
SCRATCH DSN=CTPS.NEW.QNET80.UNET.LINES,VOL=DISK=TEMP01
SCRATCH DSN=CTPS.NEW.QNET80.UNET.FREQTABL,VOL=DISK=TEMP01
SCRATCH DSN=CTPS.NEW.QNET80.UNET.LINKS,VOL=DISK=TEMP01
SCRATCH DSN=CTPS.NEW.QNET80.UNET.ANOTDABL,VOL=DISK=TEMP01
SCRATCH DSN=CTPS.NEW.QNET80.UNET.COORDS,VOL=DISK=TEMP01
//**
//*****
//**-----
//UNET  PROC  LIB='BTPD.URD81.PROGLIB',UNITLIB='DISK,VOL=SER=DSK34F',
//          CLASS=A,CORE=200K,UNIT1='DISK,VOL=SER=DSK36C',
//          ONET=DUMMY,UNITONE='DISK,VOL=SER=DSK36C',
//          NNET=DUMMY,UNITNNE='DISK,VOL=SER=DSK36C',
//          UNIT2='DISK,VOL=SER=DSK36C',UNIT3='DISK,VOL=SER=DSK36C',
//          UNIT4='DISK,VOL=SER=DSK36C',UNIT5='DISK,VOL=SER=DSK36C',
//          PLOTTER=DUMMY,UNITPLO='DISK,VOL=SER=DSK36C'
//UNET  EXEC  PGM=UNET,REGION=&CORE
//**          UMTA PROCEDURE FOR UNET
//**          BUILD OR UPDATE TRANSIT NETWORKS
//** UMTA - G55001 -GIBSON -426-9271 -577
//STEPLIB DD UNIT=&UNITLIB,DSN=&LIB,DISP=( SHR,PASS)  PROGLIB
//FT01F001 DD &NNET,UNIT=&UNITNNE,DISP=( ,KEEP),      LINES
//          DCB=(RECFM=VBS,LRECL=2004,BLKSIZE=2008)
//FT01F002 DD &NNET,UNIT=&UNITNNE,DISP=( ,KEEP),      FREQ
//          DCB=*.FT01F001
//FT01F003 DD &NNET,UNIT=&UNITNNE,DISP=( ,KEEP),      LINKS
//          DCB=*.FT01F001

```

```

//FT01F004 DD &NNET,UNIT=&UNITNNE,DISP=(,KEEP),          ANODE
//          DCB=*.FT01F001
//FT01F005 DD &NNET,UNIT=&UNITNNE,DISP=(,KEEP),          COORD
//          DCB=*.FT01F001
//FT05F001 DD DDNAME=SYSIN
//FT06F001 DD SYSOUT=&CLASS
//FT08F001 DD UNIT=&UNITS2,SPACE=(TRK,(20,10)),          SCR2
//          DCB=(RECFM=VBS,LRECL=2004,BLKSIZE=2008)
//FT09F001 DD UNIT=&UNITS3,SPACE=(TRK,(10,10)),          SCR3
//          DCB=*.FT08F001
//FT10F001 DD UNIT=&UNITS4,SPACE=(TRK,(20,10)),          SCR4
//          DCB=*.FT08F001
//FT11F001 DD UNIT=&UNITS5,SPACE=(TRK,(20,10)),          SCR5
//          DCB=*.FT08F001
//FT12F001 DD &ONET,UNIT=&UNITONE,DISP=(OLD,KEEP)
//FT13F001 DD &ONET,UNIT=&UNITONE,DISP=(OLD,KEEP)
//FT14F001 DD &ONET,UNIT=&UNITONE,DISP=(OLD,KEEP)
//FT15F001 DD &ONET,UNIT=&UNITONE,DISP=(OLD,KEEP)
//FT16F001 DD &ONET,UNIT=&UNITONE,DISP=(OLD,KEEP)
//FT20F001 DD UNIT=&UNITS1,SPACE=(TRK,(1,1)),          SCR1
//          DCB=(RECFM=FB,LRECL=80,BLKSIZE=800),DISP=(,PASS)
//*T21F001 DD DSN=URD81.LOG,DISP=SHR
//FT21F001 DD DUMMY
//FT49F001 DD DSN=&&FT49,UNIT=DISK,SPACE=(TRK,(1,1)),
//          DISP=(,PASS),DCB=(RECFM=F,LRECL=80,BLKSIZE=80)
//UPL0T1 EXEC PGM=UPL0T,COND=(3,NE,UNET),REGION=&CORE
//*          UMTA PROCEDURE FOR UPL0T
//*          PLOT NETWORKS AND PATHS
//*          EXECUTED ONLY WHEN UNET ISSUES A RC=3
//*          * - A PLOT ONLY RUN - *
//STEPLIB DD DSN=&LIB,UNIT=&UNITLIB,DISP=(SHR,PASS)          PROGLIB
//FT01F001 DD &ONET,UNIT=&UNITONE,DISP=(SHR,KEEP)
//FT01F002 DD &ONET,UNIT=&UNITONE,DISP=(SHR,KEEP)
//FT01F003 DD &ONET,UNIT=&UNITONE,DISP=(SHR,KEEP)
//FT01F004 DD &ONET,UNIT=&UNITONE,DISP=(SHR,KEEP)
//FT01F005 DD &ONET,UNIT=&UNITONE,DISP=(SHR,KEEP)
//FT05F001 DD DSN=*.UNET.FT20F001,DISP=(OLD,DELETE)
//FT06F001 DD SYSOUT=&CLASS
//FT20F001 DD UNIT=&UNITS1,SPACE=(TRK,(1,1)),          SCR1
//          DCB=(RECFM=FB,LRECL=72,BLKSIZE=720)
//*T21F001 DD DSN=URD81.LOG,DISP=SHR
//FT21F001 DD DUMMY
//FT22F001 DD &PLOTTER,DISP=(NEW,KEEP),UNIT=&UNITPLO
//FT23F001 DD SYSOUT=&CLASS,DCB=(RECFM=FA,BLKSIZE=133)
//PLOT0APE DD &PLOTTER,DISP=(NEW,KEEP),UNIT=&UNITPLO

```

```
//FT49F001 DD DSN=&&FT49,DISP=(OLD,PASS),UNIT=DISK
//UPL0T2 EXEC PGM=UPL0T,COND=(4,NE,UNET),REGION=&CORE
//* UMTA PROCEDURE FOR UPL0T
//* PLOT NETWORKS AND PATHS
//* EXECUTED ONLY WHEN UNET ISSUES A RC=4
//* * - A NETWORK BUILD OR UPDATE RUN
//STEPLIB DD DSN=&LIB,UNIT=&UNITLIB,DISP=(SHR,PASS) PROGLIB
//FT01F001 DD &NNET,UNIT=&UNITNNE,DISP=(SHR,KEEP)
//FT01F002 DD &NNET,UNIT=&UNITNNE,DISP=(SHR,KEEP)
//FT01F003 DD &NNET,UNIT=&UNITNNE,DISP=(SHR,KEEP)
//FT01F004 DD &NNET,UNIT=&UNITNNE,DISP=(SHR,KEEP)
//FT01F005 DD &NNET,UNIT=&UNITNNE,DISP=(SHR,PASS),LABEL=5
//FT05F001 DD DSN=*.UNET.FT20F001,DISP=(OLD,DELETE)
//FT06F001 DD SYSOUT=&CLASS
//FT20F001 DD UNIT=&UNITS1,SPACE=(TRK,(1,1)),SCR1
// DCB=(RECFM=FB,LRECL=72,BLKSIZE=720)
//*T21F001 DD DSN=URD81.LOG,DISP=SHR
//FT21F001 DD DUMMY
//FT22F001 DD &PLOTTER,DISP=(NEW,KEEP),UNIT=&UNITPLO
//FT23F001 DD SYSOUT=&CLASS,DCB=(RECFM=FA,BLKSIZE=133)
//PLOT0APE DD &PLOTTER,DISP=(NEW,KEEP),UNIT=&UNITPLO
//FT49F001 DD DSN=&&FT49,DISP=(OLD,PASS),UNIT=DISK
//PROCEND PEND
//*****
//STEPHEAD EXEC PGM=IEBGENER
//SYS0PRINT DD SYSOUT=R
//SYSUT2 DD UNIT=DISK,VOL=SER=TEMP01,DISP=(NEW,PASS),
// SPACE=(TRK,(1,1),RLSE),DCB=(RECFM=FB,LRECL=80,BLKSIZE=7200),
// DSNNAME=CTPS.NEW.UNET80.HEAD0NG
//SYSIN DD DUMMY
//SYSUT1 DD *
CTPS.NEW.QNET80.AL0DATA.NOHEAD.NEWUNET
NEW UNET FILE IS CREATED WITH UPNET CHANGES SHOWN ABOVE
*****
&PARAM NODES=8191,ZONES=592,LENAM=2,LENPM=11,LENNIT=5,
TIMCST(7)=1764,DSTCST(7)=74 &END
&OPTION AM=T,BUILD=T &END
&SELECT REPORT=2,5 &END
&DATA
//*
//*****
//*****DATA SET CONCATENATION*****
//*****
//STEPUNET EXEC PGM=IEBGENER
//SYS0PRINT DD SYSOUT=R
```

```
//SYSUT2      DD DSN=&XNET,UNIT=DISK,SPACE=(TRK,(120,12),RLSE,CONTIG),
//      VOL=SER=TEMP01,
//      DISP=(NEW,PASS),DCB=(RECFM=FB,LRECL=80,BLKSIZE=7200)
//SYSIN       DD DUMMY
//SYSUT1      DD DSN=CTPS.NEW.UNET80.Heading,
//      VOL=SER=TEMP01,UNIT=DISK,DCB=(RECFM=FB,LRECL=80,BLKSIZE=7200),
//      DISP=(OLD,DELETE)
//      DD DSN=CTPS.NEW.QNET80.ALldata.NOHEAD.NEWUNET,
//      VOL=SER=DSK36C,UNIT=DISK,DCB=(RECFM=FB,LRECL=80,BLKSIZE=7200),
//      DISP=(OLD,KEEP)
//*****
//*****START PROGRAM UNET*****
//*****
//UNETRTAM     EXEC UNET,CLASS=A
//UNET.FT01F001 DD DSN=CTPS.NEW.QNET80.UNET.LINES,
//      VOL=SER=TEMP01,UNIT=DISK,DISP=(NEW,KEEP),SPACE=(TRK,(6,6),RLSE)
//UNET.FT01F002 DD DSN=CTPS.NEW.QNET80.UNET.FREQTABL,
//      VOL=SER=TEMP01,UNIT=DISK,DISP=(NEW,KEEP),SPACE=(TRK,(12,6),RLSE)
//UNET.FT01F003 DD DSN=CTPS.NEW.QNET80.UNET.LINKS,
//      VOL=SER=TEMP01,UNIT=DISK,DISP=(NEW,KEEP),SPACE=(CYL,(10,1),RLSE)
//UNET.FT01F004 DD DSN=CTPS.NEW.QNET80.UNET.ANODTABL,
//      VOL=SER=TEMP01,UNIT=DISK,DISP=(NEW,KEEP),SPACE=(TRK,(12,6),RLSE)
//UNET.FT01F005 DD DSN=CTPS.NEW.QNET80.UNET.COORDS,
//      VOL=SER=TEMP01,UNIT=DISK,DISP=(NEW,KEEP),SPACE=(TRK,(12,6),RLSE)
//UNET.FT05F001 DD DSN=&XNET,
//      VOL=SER=TEMP01,
//      UNIT=DISK,DISP=(OLD,PASS),DCB=(RECFM=FB,LRECL=80,BLKSIZE=7200)
//*
//*****
//*****START UPATH PROGRAM*****
//*****UPON SUCCESSFUL COMPLETION OF ABOVE UNET RUN*****
//
@
```

```

/*-----
*****UPATH PROGRAM PROC*****
/*-----
//UPATH PROC CLASS=A,                                00000100
//      CORE=256K,                                    00000200
//      LIB='BTPD.URD81.PROGLIB',UNITLIB='DISK,VOL=SER=DSK34F', 00000300
//      NET=DUMMY,UNITNET='DISK,VOL=SER=DSK36C',          00000400
//      PATH=DUMMY,UNITPAT='DISK,VOL=SER=DSK36C',         00000500
//      J1=DUMMY,UNITJ1='DISK,VOL=SER=DSK36C',           00000600
//      UNITSCR=DISK                                     00000700
//*****
//      UTPS PROCEDURE FOR UPATH - 12DEC82                * 00000800
//      TO BUILD TRANSIT PATHS AND IMPEDANCE MATRICES     * 00000900
//      CONTACT: UTPS SUPPORT CENTER (800) 638-8747       * 00001000
//*****
//      SYMBOLIC REFERENCES                               * 00001100
//      * * * * *                                         * 00001200
//      CLASS = SYSOUT PRINT CLASS                        * 00001300
//      CORE = REGION SIZE                                * 00001400
//      LIB = NAME OF PROGRAM LIBRARY                     * 00001500
//      NET = INPUT TRANSIT NETWORK THROUGH WHICH PATHS   * 00001600
//              OF MINIMUM IMPEDANCE ARE TO BE FOUND.     * 00001700
//              NET IS USUALLY IN 4-FILE TAPE FORMAT.     * 00001800
//      PATH = TRANSIT PATH FILE TO BE CREATED           * 00001900
//      J1 = OUTPUT MATRIX FILE CONTAINING TRANSIT DISTANCE, * 00002000
//              FARE AND IMPEDANCE SKIM TABLES AS REQUESTED. * 00002100
//*****
//      DATA CARD FILES                                  * 00002200
//      * * * * *                                         * 00002300
//      SYSIN = UPATH CONTROL CARDS, AND OPTIONALLY,      * 00002400
//              TRANSIT FARE LINK CARDS                   * 00002500
//*****
//      00002600
//      00002700
//      00002800
//      00002900
//      00003000
//      00003100
//      00003200
//UPATH EXEC PGM=UPATH,REGION=&CORE                      00003300
//STEPLIB DD DSN=&LIB,UNIT=&UNITLIB,DISP=SHR              00003400
//FT01F001 DD &NET,UNIT=&UNITNET,DISP=SHR                00003500
//FT02F001 DD &NET,UNIT=&UNITNET,                        00003600
//      DISP=SHR,LABEL=2

```

```
//FT03F001 DD &NET,UNIT=&UNITNET, 00003700
//          DISP=SHR,LABEL=3        00003800
//FT04F001 DD &NET,UNIT=&UNITNET, 00003900
//          DISP=SHR,LABEL=4        00004000
//FT05F001 DD DDNAME=SYSIN          00004100
//FT06F001 DD SYSOUT=&CLASS          00004200
//FT09F001 DD &PATH,UNIT=&UNITPAT,DISP=(,KEEP), 00004300
//          DCB=(RECFM=VBS,LRECL=2004,BLKSIZE=2008) 00004400
//FT10F001 DD UNIT=&UNITSCR,SPACE=(TRK,(1,1)), 00004500
//          DCB=(RECFM=FB,LRECL=80,BLKSIZE=800) 00004600
//FT11F001 DD &J1,UNIT=&UNITJ1,DISP=(,KEEP), 00004700
//          DCB=(RECFM=VBS,LRECL=1604,BLKSIZE=1608) 00004800
//FT12F001 DD UNIT=&UNITSCR,SPACE=(TRK,(19,19)), 00004900
//          DCB=*.FT09F001          00005000
//FT13F001 DD UNIT=&UNITSCR,SPACE=(TRK,(19,19)), 00005100
//          DCB=*.FT09F001          00005200
//FT20F001 DD UNIT=&UNITSCR,SPACE=(TRK,(1,1)), 00005300
//          DCB=(RECFM=FB,LRECL=72,BLKSIZE=720) 00005400
//*T21F001 DD DSN=URD81.LOG,DISP=SHR 00005500
//FT21F001 DD DUMMY                00005500
//          PEND
//*****
//SCRATCHX EXEC PGM=IEFBRI4
//PATHFILE DD UNIT=DISK,VOL=SER=TEMP01,DISP=(OLD,DELETE),
//          DSN=CTPS.NEW.QNET80.AMPATHS
//LINKFILE DD UNIT=DISK,VOL=SER=TEMP01,DISP=(OLD,DELETE),
//          DSN=CTPS.NEW.QNET80.LINKFILE
//ALOCFILE DD UNIT=DISK,VOL=SER=TEMP01,DISP=(OLD,DELETE),
//          DSN=CTPS.NEW.QNET80.ALOCFILE
//PATHSKMS DD UNIT=DISK,VOL=SER=TEMP01,DISP=(OLD,DELETE),
//          DSN=CTPS.NEW.QNET80.PATHSKMS
//FTRANSIT DD UNIT=DISK,VOL=SER=TEMP01,DISP=(OLD,DELETE),
//          DSN=CTPS.NEW.QNET80.FTRANSIT
//RAWFARES DD UNIT=DISK,VOL=SER=TEMP01,DISP=(OLD,DELETE),
//          DSN=CTPS.NEW.QNET80.RAWFARES
//TRANSITF DD UNIT=DISK,VOL=SER=TEMP01,DISP=(OLD,DELETE),
//          DSN=CTPS.NEW.QNET80.TRANSIT.FARES
//*
//*****
//*** ADD OUTLIM=4000 TO LIMIT NO OF LINES OF OUTPUT DURING TEST
//*****
```

```
//UPATHRUN EXEC UPATH,
//  TIME=1440,NET='VOL=SER=TEMP01',UNITNET=DISK,
//  CLASS='A,OUTLIM=4000',
//  PATH='DSN=CTPS.NEW.QNET80.AMPATHS',UNITPAT=DISK
//*****
//UPATH.FT01F001 DD DSN=CTPS.NEW.QNET80.UNET.LINES
//*****
//UPATH.FT02F001 DD DSN=CTPS.NEW.QNET80.UNET.FREQTABL
//*****
//UPATH.FT03F001 DD DSN=CTPS.NEW.QNET80.UNET.LINKS
//*****
//UPATH.FT04F001 DD DSN=CTPS.NEW.QNET80.UNET.ANODTABL
//*****
//UPATH.FT09F001 DD SPACE=(TRK,(60,30),RLSE),VOL=SER=TEMP01,
//  DISP=(NEW,KEEP)
//*****
//UPATH.FT11F001 DD UNIT=DISK,DISP=(NEW,KEEP,DELETE),VOL=SER=TEMP01,
//  SPACE=(TRK,(10,10),RLSE),DSN=CTPS.NEW.QNET80.RAWFARES
//*****
//UPATH.FT12F001 DD UNIT=DISK,DISP=(NEW,KEEP,DELETE),VOL=SER=TEMP01,
//  SPACE=(TRK,(25,10),RLSE),DSN=CTPS.NEW.QNET80.LINKFILE
//*****
//UPATH.FT13F001 DD UNIT=DISK,DISP=(NEW,KEEP,DELETE),VOL=SER=TEMP01,
//  SPACE=(TRK,(25,10),RLSE),DSN=CTPS.NEW.QNET80.ALOCFILE
//*****
//UPATH.SYSIN DD *
**UPATH EXAMPLE SETUP
PRINT OUT OF SAMPLE PATHS 1, 100, 193 AND 592
&PARAM
XFERS=4,
WMIN=0.0,0.0,0.0,1.0,1.0,1.0,1.0,1.0,
XMIN=0.0,0.0,0.0,1.0,1.0,1.0,1.0,1.0,
WMAX=0.0,0.0,0.0,20.0,20.0,20.0,20.0,20.0,
XMAX=0.0,0.0,0.0,20.0,20.0,20.0,20.0,20.0,
WADD=0.0,0.0,0.0,2.0,2.0,2.0,2.0,2.0,
XADD=0.0,0.0,0.0,2.0,2.0,2.0,2.0,2.0,
CXTIME=0.0,0.0,0.0,1.0,1.0,1.0,1.0,1.0,
CWTIME=0.0,0.0,0.0,1.0,1.0,1.0,1.0,1.0,
CTTIME=0.1,1.0,1.0,1.0,1.0,1.0,1.0,1.0,
CDIST(1)=8*1.0
&END
```

```
&OPTION
  AM=T,
  NOX(1,2)=2*T, NOX(1,3)=2*T,
  NOX(2,1)=2*T, NOX(2,3)=T, NOX(2,4)=T, NOX(2,5)=T, NOX(2,6)=T,
  NOX(2,7)=T, NOX(2,8)=T,
  NOX(3,2)=T,
  NOX(4,2)=T,
  NOX(6,3)=2*T,
  NOX(8,8)=T,
  PRINDT=T
&END
&SELECT
  REPORT=3,
  I=1, -592,
  IMPED='TRANS IMPED',
  PRINT=1, 100, 193, 592
&END
/*
//*****END OF UPATH PROGRAM*****
//
@
```

F. ALLIED PROGRAMS DEVELOPED AND USED
IN CONJUNCTION WITH NETWORK

A number of special computer programs were developed to produce the final data sets required for the UTPS program UNET. These special programs produced link data consistent with the highway network data as to speed and link distances. For example, many of the bus routes coincide with the main thoroughfares of the local areas, except for some minor excursions to side streets. Excursions to some side streets, hence, the speed and distance for the UNET links should be consistent with the actual highway speeds (factored when appropriate for bus route operation). Express buses were assigned the same speed as the highway speed for the time period involved. Local bus speeds were determined from the UMTA characteristics given in Section III-2 of the UTPS Network Development Manual.

Other CTPS computer programs of value for network changes include:

- MISNODE: Program to determine node numbers not in use. Note: UNET also lists node numbers not used, but for ANODE usage only.
- UPNET: To edit coordinates, links, and lines in a data set already on disk. This program is valuable for changing, correcting, or adding to a data set already in the computer system. See section 5.3.2.
- RECMNG: Used to select particular records from a data set on disk. Records up to 250 bytes in length may be selected and up to four selected byte columns of the record may be the basis of selection. For example, to select only LINK cards, select cards with '1' in column 1. Care must be exercised in the selection of the byte columns. This program is especially useful whenever all records are of similar format, such as link cards. An example is given in section 5.3.3. For further details, see the write-up on general purpose subroutines and utility programs in the CTPS Software User's Guide.

